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Exploring Memorable Messages about the Misuse of Prescription Stimulants: Predicting Behavioral Intention and Illicit Stimulant Use

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Exploring Memorable Messages about the Misuse of Prescription Stimulants: Predicting Behavioral Intention and Illicit Stimulant Use

by

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Dedication

To my mom, as a model of superior dedication and hard work for all that you achieve, for giving everything to my education, and for being unwaveringly supportive, intellectually curious, and forever kind.

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Exploring Memorable Messages about the Misuse of Prescription Stimulants: Predicting Behavioral Intention and Illicit Stimulant Use

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The illicit use of prescription stimulants among college undergraduates is a prevalent and dangerous problem on college campuses across the United States. Though classified by the U. S. Drug Enforcement Agency as schedule II controlled substances (U.S. Department of Justice, 2008), undergraduates obtain these medications through peers and friends, and report misusing of these stimulants to aid their concentration and studying (DeSantis, Webb, & Noar, 2008). Because extant research concludes that the prevalence of the misuse of prescription stimulants (MPS) peaks among undergraduates, this research was guided by the Theory of Planned Behavior (Ajzen, 1985, 1991) as well as a memorable messages framework (Knapp, Stohl, & Reardon, 1981), and sought to examine the messages that college students recall about MPS, how those messages are associated with student's intention to use stimulants directly, as well as indirectly through changes in attitudes, normative beliefs, and efficacy, and finally, to examine if receiving a memorable message predicts changes in intention to use, or actual use of stimulants over time.

Data for the main study were collected in October 2014, and 137 undergraduate students reported a memorable message about MPS and were retained for analysis. Four

weeks later, a follow-up survey was launched, and 89 undergraduates also completed the second survey.

Results suggest that undergraduates do recall memorable messages about MPS, and the content focuses on the themes of academics, health outcomes, and responsible use. Additionally, memorable messages tended to be more negative than positive, and came from a variety of sources including close friends and peers, family members, instructors, and medical professionals, to name a few. Further, participants' attitudes and normative beliefs were positively associated with behavioral intention at Time 1. Additionally, behavioral intention at Time 1 was positively associated with behavioral use at Time 2. The findings from this research provide several practical implications for future health education and promotion campaigns.

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Chapter One: Rationale

Misuse of prescription stimulants has become a fast growing problem on college campuses across the country with scholarship suggesting an enduring upward trend of college students' misuse of prescription medication. In 2009, college and high school students' misuse of prescription stimulant medication had become the second most common form of illicit drug use, preceded by marijuana (Johnston, O'Malley, Bachman, & Schulenberg, 2010). In 2013, rates of illicit stimulant use rose to 10.6% from 5.7% in 2008; with college students reporting higher rates of Adderall use without a prescription (10.7%) compared to their non-college peers (6.8%) (Egan, Reobussin, Blocker, Wolfson, & Stufin, 2013; Johnston, O'Malley, Bachman, & Schulenberg, 2013).

Because peers and friends play a central role in college, and students lack parent supervision and experience fewer role constraints (Arnett, 2000), undergraduates are able to engage in risky behaviors, such as using stimulants, at their choosing. For example, college students aged 18-25 are at an increased risk to engage in adverse health behaviors including illicit drug use, binge drinking, unsafe sex (Johnston, O'Malley, Bachman, & Schulenberg, 2009; McCabe, Knight, Teter, & Wechsler, 2005a), and prescription drug misuse more often than same aged peers who do not attend college (Herman-Stahl, Krebs, Kroutil, & Heller, 2007; Johnston et al., 2009, 2013; McCabe et al., 2005a; McCabe, Boyd, & Teter, 2009).

Among undergraduates, stimulant medications are known as "universal performance enhancers" and "study drugs" because they are perceived to increase attentiveness and awareness in users (Custode & Norvilitis, 2012; Svetlov, Kobeissy, &

Gold, 2007). Stimulants are medications that increase normal brain functioning, resulting in an elevated state of alertness, attention, and energy (National Institute on Drug Abuse [NIDA], 2009). Though relatively safe when used appropriately and as prescribed, ADHD medications (including Adderall®, Ritalin®, and Concerta®) are stimulants, amphetamine-based, habit-forming, and are classified by the U.S. Drug Enforcement Agency as schedule II controlled substances, which includes substances that have a high risk for abuse (U.S. Department of Justice, 2008) and may lead to psychological or physical dependence (U.S. Department of Justice, 2013). Individuals engaging in the misuse of prescription stimulants (MPS) can face substance misuse and dependency issues in addition to physical symptoms such as irregular heartbeat, high blood pressure, heart attacks, stroke (NIDA, 2009, 2011; Sussman, Pentz, Spruijt-Metz, & Miller, 2006; White, Becker-Blease, & Grace-Bishop, 2006), blurred vision, dizziness, insomnia, headaches, muscle twitches (NIDA, 2009, 2011; White et al., 2006) as well as psychological symptoms such as hallucinations, paranoia, delusions, and repetitive behaviors (Babcock & Byrne, 2000; Braun et al., 2004; NIDA, 2009, 2011; Sussman et al., 2006). Additionally, exposure to high doses of stimulant medication can increase anxiety, aggressiveness, confusion, and hostility (Braun et al., 2004; NIDA, 2009, 2011; Sussman et al., 2006).

Although individuals who engage in MPS have the possibility to experience a variety of adverse physical and psychological issues, stimulant medications tend to be perceived by undergraduates to be more socially acceptable and safer than “street substances” (Ford & Schroeder, 2009), as stimulants are often obtained from someone

who has a prescription. It is estimated that between 3-10% of the U.S. college student population are prescription stimulant misusers (Kadison, 2005); however, research suggests that on average 16-17% of students report misusing stimulant medication. Across studies, these rates range between 5.4% and 35%, (Babcock & Byrne, 2000; Hall, Irwin, Bowman, Frankenberger, & Jewett, 2005; Low, & Gendaszek, 2002; McCabe, Teter, Boyd, Knight, & Wechsler, 2005b; Teter, McCabe, LaGrange, Crandorf, & Guthrie, 2005; White et al., 2006).

Further, when asked about use within the past year, rates have ranged from 4% to 11% among college students (Arria, Calderia, Vincent, O'Grady, & Wish, 2008; Johnston et al., 2013). McCabe and colleagues (2005a) conducted a national survey of 10,904 randomly selected college students from 119 four-year colleges designed to target MPS among college undergraduates. They found that approximately 7% of the students reported MPS in their lifetime, with 4.1% reporting use within the previous year, and 2.1% reporting use within in the previous month. This upward trend is not surprising as MPS is correlated with higher rates of frequent binge drinking, as well as marijuana and cocaine use (McCabe et al., 2005a; McCabe & Teter, 2007; McCabe, West, & Wechsler, 2007b; Teter et al., 2005). Overall, scholarship concludes that the prevalence of prescription stimulant misuse is highest among undergraduate college students (Babcock & Byrne, 2000; DeSantis, Webb, & Noar, 2008; Johnston et al., 2009; McCabe et al., 2005b; Rabiner et al., 2009a), though the prevalence of MPS is noted to vary based upon the geographical location and admission standards of the university (Babcock & Byrne, 2000; McCabe et al., 2005a; Rabiner et al., 2009a).

The ease of obtaining stimulants among undergraduates is due in part to diversion. Diversion, the unlawful channeling of regulated pharmaceuticals and other illicit drugs (Inciardi, Surratt, Kurtz, & Burke, 2006), occurs through peers, family members, online sources, and drug dealers (El-Aneed et al., 2009; McCabe, West, & Wechsler, 2007a). Rabiner and colleagues (2009a) studied MPS among undergraduates aged 18-24 and found that 56% of participants with a current prescription for stimulants were approached to divert their medication within the preceding six months, and almost half (26%) of students indeed diverted their medication. Other studies have found similar results, with 29% to 36% of their undergraduate samples reporting diversion (Garnier et al., 2010; Upadhyaya et al., 2005).

The most commonly reported methods of diversion are through friends (DeSantis et al., 2008; McCabe et al., 2007a; Rabiner et al., 2009a), peers (El-Aneed et al., 2009), and family members (DeSantis et al., 2008; El-Aneed et al., 2009; McCabe et al., 2007a; Rabiner et al., 2009a). Taken together, these findings suggest that prescription stimulants are readily available to undergraduate students (Weyandt et al., 2009). Not surprisingly, students also report endorsement of their own MPS for recreational purposes with rates ranging from 19% (Low & Gendaszek, 2002) to 43% (Teter et al., 2005) to 65% (White et al., 2006). One reason for this reported endorsement could be due, in part, to the conversations that undergraduates have with their friends or peers surrounding MPS. This presents an opportunity for interpersonal health communication scholars to examine the conversations about stimulants generally, and stimulant use more specifically, among undergraduates.

Contrary to the perception that stimulants are effective study drugs, several studies suggest ADHD medications do not actually improve academic ability or cognitive skills. In a review, Advokat (2010) suggests that stimulants do improve prolonged attentiveness and facilitate long-term retention, but may impair more complex cognitive functioning including thinking ahead and planning, acquiring new information in short-term memory, and behavioral flexibility by reducing the user's ability to be creative and adaptive. Despite the lack of empirical support for cognitive enhancement, there is a widespread popular belief among undergraduate users and nonusers that prescription stimulants will help improve academic achievement (Advokat, Guidry, & Martino, 2008). This widespread belief is likely in part due to the role of normative beliefs shared among undergraduates.

Given the factors discussed above, the Theory of Planned Behavior (TPB; Ajzen, 1985, 1991; Ajzen & Fishbein, 1980) is a useful framework to understand how interactions among peers are associated with college students' intention and MPS. According to TPB, behavior is predicted by behavioral intention, and behavioral intention is predicted by one's attitude toward the behavior, subjective norms, and efficacy about the behavior in question. Understanding the antecedents of behavior can be augmented by additionally exploring the communication that may shape attitudes, norms, efficacy, and intention. Therefore, this study also explores memorable messages recalled by undergraduates about prescription stimulants. This research posits that features of memorable messages recalled by undergraduates will influence their attitudes, normative

beliefs, and efficacy regarding their personal MPS. Further, these variables are predicted to be associated with behavioral intention to use prescription stimulants.

In summary, MPS among college undergraduates is a growing social problem. Although research has identified the motivations and reasons for use among college students information is virtually nonexistent about the *communication* surrounding MPS that may be related to intention to use, or actual use of stimulants among undergraduates. To delve deeper into the contributions of this research, the purpose and significance of this study are described in detail next.

PURPOSE AND SIGNIFICANCE OF STUDY

Scholarship concludes that the prevalence of MPS peaks among undergraduate students. The varied results regarding MPS among college undergraduates has led researchers to call for further examination of the prevalence of MPS among college students in the United States (Babcock & Byrne, 2000; DeSantis et al, 2008; Low & Gendaszek, 2002; McCabe et al., 2005b). Because friends and peers are reported as the most common sources through which students obtain prescription stimulants, and there is a perception among undergraduates that engaging in MPS is stigma-free, interpersonal health communication scholars have a unique opportunity to examine the role that peer groups and friends play in the communication surrounding MPS. In doing so, communication researchers can help illuminate the communicative processes that have influences on undergraduates' intention to use, or actual use, of illicit stimulants.

This manuscript describes a research project that sought to address some of the fundamental questions that existing scholarship does not currently answer. Although

research has focused primarily on the motives and factors that influence illicit stimulant use, there is a dearth of scholarship examining the actual conversations college students have about illicit stimulants generally, as well as intention to use or actual use of stimulants more specifically. Research exploring MPS is largely atheoretical with only a few published articles that use a theoretical perspective to frame the illicit behavior (Checton & Green, 2010; Ford, 2008; Gallucci, Martin, Beaujean, & Usdan, 2015; Judson & Langdon, 2009; Morse et al., 2012; Peralta & Steele, 2010). Further, empirical work examining MPS among college students is relatively novel, with literature dating back less than 10 years, and with only a few published studies in communication (Checton & Greene, 2010; Morse et al., 2012). Together, this warrants an investigation grounded in theory that puts communication variables at the center of inquiry. The following section describes the conceptual framework and goals guiding the current study.

CONCEPTUAL FRAMEWORK AND GOALS OF THE STUDY

This research investigates how messages regarding illicit stimulants are associated with one's intention to use stimulants. The present research is guided by two theoretical frameworks: a memorable messages framework (Knapp, Stohl, & Reardon, 1981; Stohl, 1986) to examine the content, sources, and valence of actual messages about stimulants, and the Theory of Planned Behavior (Ajzen, 1981, 1991; Ajzen & Fishbein, 1980) to explain the variables that predict behavioral outcomes that may be influenced by memorable messages.

Guided by these theoretical frameworks, the present research sought to accomplish three goals: 1) examine the content, sources, and valence of memorable messages about stimulants shared among undergraduates; 2) examine how those characteristics of memorable messages are related to behavioral outcomes directly as well as indirectly through changes in attitudes, normative beliefs, and efficacy; and 3) examine if receiving a memorable message predicts changes in intention to use, or actual use of stimulants over time.

In regard to the first goal, this study aimed to examine empirically how the content, source, and valence of memorable messages are related to behavioral intention to engage in MPS among college undergraduates. Research has shown that memorable messages do have an effect on attitudes toward future behavior (Holladay, 2002; Smith & Ellis, 2001); thus it is likely that these messages also play a role in shaping one's attitudes, normative beliefs, and efficacy regarding MPS.

As such, the second and third goals of this study were to explore how those features of memorable messages are related to behavioral outcomes through changes in attitudes, normative beliefs, and efficacy, in addition to assessing if there are any changes over time as a result of recalling the memorable message. Exploring communication—and memorable messages about stimulants in particular—may help to illuminate the influence that communication has on students' decision to use stimulants. Understanding the type of messages that college students share, and the influence of those message characteristics on behavioral intentions and actual behavior, can help in designing more effective preventative health campaigns and interventions.

The chapter that follows is a review of the relevant literature, which provides background on the context of the transition to college and illustrates the role of peer and friend groups. Also in Chapter Two, the two theoretical frameworks that guide this study, a memorable messages framework and the Theory of Planned Behavior, are described. Finally, the study's main hypotheses and research questions shaped by those theoretical frameworks are presented. Chapter Three includes a description of the methodology used to conduct this research, and describes the findings from a pilot study that informed this research. In Chapter Four, the qualitative results are presented. In Chapter Five, the quantitative results are discussed. And finally, in Chapter Six, the contributions, limitations, and practical implications of this research and its findings are discussed.

Chapter Two: Literature Review

For young adults, college is a time of transition (Louie, 2007) that encourages individual development (Montgomery & Cote, 2005) and increases in self-reported personal and practical competence, academic skills, and cognitive complexity (Kuh, 1993). However, undergraduates also experience a variety of challenges as a part of collegiate life that can act as predictors for MPS. Next, a review of literature is presented that highlights some of these challenges in the context of MPS and describes the predictors and motivations of MPS among college undergraduates.

Academic and Social Stress as Predictors of MPS

Central to the challenges faced by college students are those related to academics, such as experiencing difficulty with the amount of coursework they must complete or struggling with the specific elements on which they will be evaluated (Roderick & Carusetta, 2006). Research examining MPS identifies a variety of reasons for use among college undergraduates. Due to the immediate effects of increased alertness and attention, scholarship suggests students' MPS is a study aid to increase their academic performance (Hernandez & Nelson, 2010) in response to stress and pressure experienced in college (Hall et al., 2005). For example, McCabe and colleagues (2005b) reported that MPS was almost twice as likely among students who earned a grade point average (GPA) of B or lower, as compared to those earning a GPA of B+ or higher.

Not surprising then, academic motivations, including staying awake, studying longer, and aiding concentration, are among the most common reasons that undergraduates report misusing stimulants (DeSantis et al., 2008; Rabiner et al., 2009a;

2009b; Teter, McCabe, LaGrange, Cranford, & Boyd, 2006). Despite the perceived benefits, using stimulants with academic motives is also perceived by undergraduates as a form of academic dishonesty: students report that using stimulants to improve academic performance is more acceptable than cheating on an exam, but less acceptable than lying about a family emergency to receive an extension on an assignment (Custode & Norvilitis, 2012).

Not only do undergraduates experience a variety of academic stressors related to exams, papers, and grades, challenges also include balancing academic and personal life, managing relational issues, establishing independence, paying for college, making health decisions, and thinking about their future (Clark, 2005; Kuo, Hagie, & Miller, 2004; Roderick & Carusetta, 2006). MPS for social motivations, including "getting high" and partying longer (DeSantis et al., 2008; Hall et al., 2005; Sharp & Rosen, 2007; Teter et al., 2006), are frequently reported by undergraduates, followed by the motivation to misuse stimulants as an attempt to lose weight (DeSantis et al., 2008; Teter et al., 2006), which is reported more by women (18%) than men (3%; Teter et al., 2006).

Further, MPS is more likely to occur among students who engage in other aversive behaviors such as binge drinking, as well as the use of marijuana and cocaine (McCabe et al., 2005b; Rabiner et al., 2010). Additionally, an association with a Greek organization and self-reported attention problems (Rabiner et al., 2010; Substance Abuse and Mental Health Services Administration [SAMHSA], 2009) are linked to MPS. Sex differences regarding the prevalence of MPS is mixed, with some studies reporting males are more likely to misuse stimulant medications than females (Low & Gendaszek, 2002;

McCabe et al., 2005a) while other studies suggest that gender is not a significant risk factor (Herman-Stahl et al., 2007; SAMHSA, 2009; White et al., 2006).

In sum, due to the challenges undergraduates experience in both their academic and social lives, college students report experiencing stress and desiring support during their collegiate experiences (Montgomery & Cote, 2005). Academic stress is relatively chronic because stressors tend to endure throughout students' academic careers, though the level of stress varies between students and fluctuates throughout the year (MacGeorge, Samter, Gillihan, 2005). Research further suggests students encounter a variety of obstacles and opportunities that can be perceived as positive, negative, or neutral—prompting them to adapt to change (Clark, 2005). If a student encounters an obstacle perceived as negative (e.g., earning a poor grade in a course), they may turn to illicit stimulants to help them cope with the challenge (e.g., use stimulants to stay awake and study for an exam). Because friends and peers are reported as the most common sources through which students obtain prescription, and there is a sense that engaging in MPS is stigma-free, this research examines the role that peer groups and friends play in the communication surrounding MPS. Next, a review of literature is presented that discusses peer groups and friendships and describes their relationship to health behaviors of college undergraduates.

PEER GROUPS, FRIENDSHIPS, AND HEALTH BEHAVIORS

Early adulthood is a time of transition in which peer influence may be more prevalent among college students because they are gaining independence from parents and living among peers (Nickerson & Nagle, 2005). Young adults are socialized in

various social groups, including peer groups (Chuang, Ennett, Bauman & Foshee, 2005), which are “collections of interacting individuals who have some degree of reciprocal influence over one another” (Rubin, Bukowski, & Parker, 2006, p. 578). Peer groups tend to possess characteristics of cohesiveness, hierarchy, similarity, and exude norms that signal membership within the group while differentiating it from outsiders (Rubin et al., 2006). Peer groups also play a role in facilitating the adoption of negative health behaviors (Duan, Chou, Andreeva, & Pentz, 2009; White & Jackson, 2004/2005), as well as positive health behaviors (Aloise-Young, Graham, & Hansen, 1994; Paek & Gunther, 2007). Peer influence more strongly predicts negative health behaviors than other sources of influence, such as parents, religious groups, residential advisors, and faculty members (Olds & Thombs, 2001; Perkins, 2002). For example, when young adults enter college, their peers become a strong source of influence regarding alcohol, substance use, and sexual activity (Kandel, 1985; Shoveller, Johnson, Langille, & Mitchell, 2004; Valliant, 1995), as engaging in these activities can facilitate social interactions in college (Maggs & Hurrelmann, 1998).

Peer groups often include friendships—voluntary relationships in which people take an active role in relationship initiation (Miell & Duck, 1986). Friendships usually develop through individuals interacting with others who share common experiences (Baumeister & Leary, 1995), or who have similar attitudes and beliefs (Berndt, 1982; Jaccard, Blanton, & Dodge, 2005). Hays (1988) defines friendship as “voluntary interdependence between two persons over time, that is intended to facilitate social-emotional goals of the participants, and may involve varying types and degrees of

companionship, intimacy, affection, and mutual assistance" (p. 395). Young adult friendships are time consuming (Argyle & Henderson, 1984), encompass a large percentage of social interactions (Liu, Sharkness, & Pryor, 2008), and fulfill a variety of interpersonal needs (Cadbury & Buhrmester, 1998). Friendship is expressed behaviorally, emotionally, and cognitively (Hays, 1984) as friends provide emotional support, assistance, and engage in secret keeping (Argyle & Henderson, 1984; Weinstock & Bond, 2000; Wright, 1984). Further, friendships are characterized by a mutual sense of trust, companionship, interdependence, liking, and disclosure (Argyle & Henderson, 1984; Bliezner & Adams, 1992; Davis & Todd, 1985; Fehr, 2008; Hays, 1988) and are considered intimate relationships due to the mutual exchange of support, reciprocity, concern, and understanding (Berndt, Hawkins, & Hoyle, 1986; Buhrmester, 1996; Laurensen, 1996). For college students specifically, dependability, caring, commitment, and trust are considered highly valued characteristics of friendship (Tesch & Martin, 1983). Gottman and Mettetal (1987) suggest that a primary goal of friendship in adolescence is learning about one's self, as friendships foster "comfort zones" or safe spaces in which young adults can explore their identities (Call & Mortimer, 2001; Elliot & Feldman, 1990).

Research examining interpersonal health effects among friends primarily focuses on peer groups—examining peer effects of alcohol use (Andrews, Tildesley, Hops, & Li, 2002; Urberg, Degirmenciogly, Pilgrim, 1997), as well as peer influences on initiation, continuation, and cessation of smoking behavior (Burt & Peterson, 1998; Chen, White, & Pandina, 2001; Kaplan, Napoles-Springer, Stewart, & Perez-Stable, 2001).

Communication research has also connected the use of drugs and alcohol to individuals' peer networks (Dsilva, 1999; Paek & Gunther, 2007). Further, Dishion and colleagues (1999) suggest that peer "deviancy training" is subtle, occurring not only through peer modeling, but also through conversational and behavioral rewards among friends. This existing research highlights the role of communication shared between peers about substance use, including MPS. The present research aimed to cast a wider net regarding the communication occurring within peer networks; it focused on messages shared from a variety of sources, including general peers and friends. Further, this research considers whether the content and valence of messages about stimulant use vary by relationship type (e.g., peer vs. close friend) by considering relational closeness and similarity with the message sender.

Overall, little is known about the context of these conversations, the breadth of the topics discussed, and what messages are communicated that may encourage or discourage young adults to engage in illicit stimulant use. Because of the lack of research exploring the messages shared by members of one's network to influence behavioral intentions, this research attempts to fill that gap. Memorable messages often serve as guides to behavior (Smith & Ellis, 2001), and these messages are a medium through which attitudes, norms, and efficacy can be influenced. To provide a more comprehensive understanding of the actual communication surrounding the memorable messages of illicit stimulants a review of research on memorable messages is presented next.

MEMORABLE MESSAGES

Memorable messages can provide a useful framework to examine the conversations undergraduates have with others about illicit stimulants. Stohl (1986) suggests "memorable messages are heuristic devices people use for understanding and behaving in new situations" (p. 233). Because college is a unique experience in which students are often on their own for the first time, juggling multiple classes, involvement in organizations, and jobs, students likely go through a variety of "heuristic devices" attempting to navigate their experiences (Nazione et al., 2011). Due to the stress and novelty related to the college experience, it seems likely that college students may be able to recall memorable messages about MPS.

Memorable messages are characterized as: brief and orally delivered, personally involving and important to the recipient, applying to a variety of contexts, delivered when the recipient is open, and having a sender that is respected and/or of higher status than the receiver (Knapp et al., 1981; Stohl, 1986). Knapp and colleagues (1981) found that memorable messages were often rule structured, resembling rules that served to "regulate, interpret, evaluate, justify, correct, predict, and explain behavior" (Shimanoff, 1980, p. 83). Further, Stohl (1986) suggested that memorable messages function like "weak scripts" by structuring cognitive heuristics that guide behavior and contribute to sense making (p. 242). Additionally, memorable messages are usually communicated in private (Barge & Schlueter, 2004; Knapp et al., 1981), are serious in nature (Ford & Ellis, 1998; Knapp et al., 1981), are more often positive than negative (Knapp et al., 1981; Stohl, 1986), and are perceived to have senders with kind intentions (Knapp et al., 1981).

Stohl (1986) suggests that "the only necessary and sufficient condition that distinguishes a memorable message from the thousand of others we received each day is the retrospective judgment by the individual that the message was/is significant and can be precisely recalled" (p. 234). Further, Holladay (2002) suggests that memorable messages are distinguished from other fleeting and unremembered messages by being perceived as important components of communication due to their strong effect on behavior and sense making processes. In fact, research has demonstrated that people are confident in their ability to precisely recall memorable messages (Barge & Schlueter, 2004; Holladay, 2002; Stohl, 1986), and the seminal research on memorable messages found that participants were able to report the same message five months after initial data collection (Knapp et al., 1981).

Scholarship has further demonstrated that receivers do infer motives behind memorable messages, and messages have effects on attitudes toward future behavior (Holladay, 2002; Smith & Ellis, 2001). For example, Holladay (2002) asked participants to describe the content, certainty of wording, their own age, characteristics of sender, setting, applicability of the content, perceptions of sender's purpose, and effect of the message on their thoughts regarding memorable messages about anti-aging. The findings of this research suggested that receivers of memorable messages do infer benevolent and malevolent intentions from the source of the message. Because memorable messages are ones that recipients recall for a long period of time and perceives to have an influence on their life (Knapp et al., 1981; Stohl, 1986), using a memorable message framework to study the messages undergraduates receive regarding illicit stimulants, and the way in

which these messages influence behavioral intentions or actual use of stimulants, should contribute to the scholarship about communication and illicit stimulants in at least two ways.

First, identifying the characteristics and context of the message itself are important to understanding how the messages influence health outcomes (Ford & Ellis, 1998) as scholarship suggests that memorable message influence recipients' perceptions as well as their intent to engage in future behavior (Holladay, 2002). Through exploring the memorable messages recalled by undergraduates, this study evaluates the message features that may be most related to their future behavior.

Secondly, communication scholars argue that message interpretation has health consequences (Thoits, 1995). Evaluating memorable messages provides a framework to evaluate the effects of those messages by assessing how individuals perceive the messages influenced them. Smith and Ellis (2001) suggest that the mechanism underlying the behavioral action produced by memorable messages is the negative feedback loop from Control Theory (Carver & Scheier, 1982, 1990; Powers, 1973; Weiner, 1948). Control theory (Carver & Scheier, 1982) suggests that when individuals recognize a significant gap between their ideal and current state, they will be motivated to take action to reduce the discrepancy and move toward their ideal state. Smith and Ellis (2001) posit that extreme behaviors (e.g., substance misuse) may "exhibit more connection to memorable messages than those behaviors that are less extreme and closer to the baseline of normal behavior that would not include the control feedback loop" (p. 165). Although memorable messages can be studied using control theory, this study utilizes a health

behavior theory that explicitly incorporates the role of peers to explain the variables that predict behavioral outcomes (i.e., the Theory of Planned Behavior, Ajzen, 1985, 1991). These predictors of behaviors may also be influenced by memorable messages. Before further exploring how memorable messages are associated with behavioral outcomes, the characteristics of the memorable messages themselves will be considered.

The current study explored the memorable messages about stimulant use as well as the broader context in which they occur and the different topics and sources of the messages themselves. Memorable messages have been shown to guide sense-making (Stohl, 1986), behavior (Smith et al., 2009), and self-assessment of behavior (Ellis & Smith, 2004; Smith & Ellis, 2001; Smith, Ellis, & Yoo, 2001); therefore, they should shed light on the features that may influence students' decision to engage in MPS. As such, the following research questions are posed regarding the content, valence, and sources of memorable messages about MPS:

Research Question 1: What are the topics or themes of memorable messages about MPS?

Research Question 2: What is the valence of memorable messages about MPS?

Research Question 3: Who are the sources of memorable messages about MPS?

Because young adults are likely to seek out their friends for help and advice, particularly in times of distress (Buhrmester, 1990), it is important to evaluate the characteristics and features of memorable messages received from friends as compared to other sources. The role of a friend is to be supportive, accepting, and helpful (Reohr, 1991), and friends may provide support that makes individuals feel good about

themselves and encourages them to achieve their personal goals (Burleson, Samter, & Lucchetti, 1992). When providing support, a friend may also share personal beliefs about the topic under discussion, as disclosure has been found to be a central component of closeness (Parks & Floyd, 1996). By talking to a friend, individuals can understand what beliefs that person holds, how widely those beliefs are shared, and whether others expect them to hold similar beliefs or engage in similar behaviors (Real & Rimal, 2007). For example, when students consider taking prescription stimulants, they may turn to their close friends to disclose that decision and seek advice, or they may ask their friend or peer for stimulants or help in obtaining stimulants. This interaction may include a memorable message about stimulants that influences the student's intention to use stimulants in the future, which may vary by how close or similar they feel to the sender of the memorable message.

The characteristics of friendship described above highlight the role that relational closeness and similarity to peers and friends may play in students' interpretation of memorable messages. Literature focusing on adolescence consistently demonstrates similarity of substance use between peers (Ennett & Bauman, 1991, 1994; Urberg et al., 1997), and suggests similarity is due to socialization and selection. Andrews and colleagues (2002) conceptualize socialization as the influences of the peer group on the behavior of the individual and selection as the association one has with peers that are similar to oneself in regard to substance use behavior. Research has examined behavioral similarity (i.e., homophily) among peers as an indicator of peer influence. The idea of homophily suggests that social groups share similar socio-demographic, behavioral, and

interpersonal characteristics (McPherson, Smith-Lovin, & Cook, 2001). Johnson and colleagues (2003) argue that closeness is an important criterion for measuring the status of friendship, and as such, it may also influence the interpretation of memorable messages shared. Thus, the current study examines the sources of memorable messages about stimulant use as well as explores the role that relational closeness and similarity with the source plays in regard to the themes and valence of those messages received. As such, the following research questions are offered:

Research Question 4: Do the topics or themes of memorable messages vary by (a) relational closeness and (b) similarity?

Research Question 5: How is the valence of memorable messages related to (a) relational closeness and (b) similarity?

In addition to exploring the characteristics of memorable messages about stimulant use among college undergraduates, this research seeks to examine the outcomes of recalling these messages. This is important to examine, as research reports that during final exams, as many as 27% of students report engaging in MPS and 15% report MPS before other exams (Hall et al., 2005). Given that they are memorable, messages about stimulants may influence students' behavioral outcomes. As memorable messages have been shown to guide sense-making (Stohl, 1986), behavior (Smith et al., 2009), and self-assessment of behavior (Ellis & Smith, 2004; Smith & Ellis, 2001; Smith et al., 2001), they should help predict individuals intention to use, or actual use, of stimulants.

In a study exploring how memorable messages can guide behavior, Smith and Ellis (2001) demonstrated that not only do memorable messages exist; they can act as

guide to later behavior if an individual can recall the message at the time of assessing his or her own behavior. In their study, participant actions were found to be consistent with or in contrast with the memorable message in the study (Smith & Ellis, 2001). For example, when assessing behaviors of kindness, loyalty, and patience, memorable messages were consistent with the behavior and included “be helpful” and “lend a hand” (Smith & Ellis, 2001, p. 162). However, when assessing the behavior of substance misuse, messages were in contrast with the behavior and included “live a healthy life” (Smith & Ellis, 2001, p. 165).

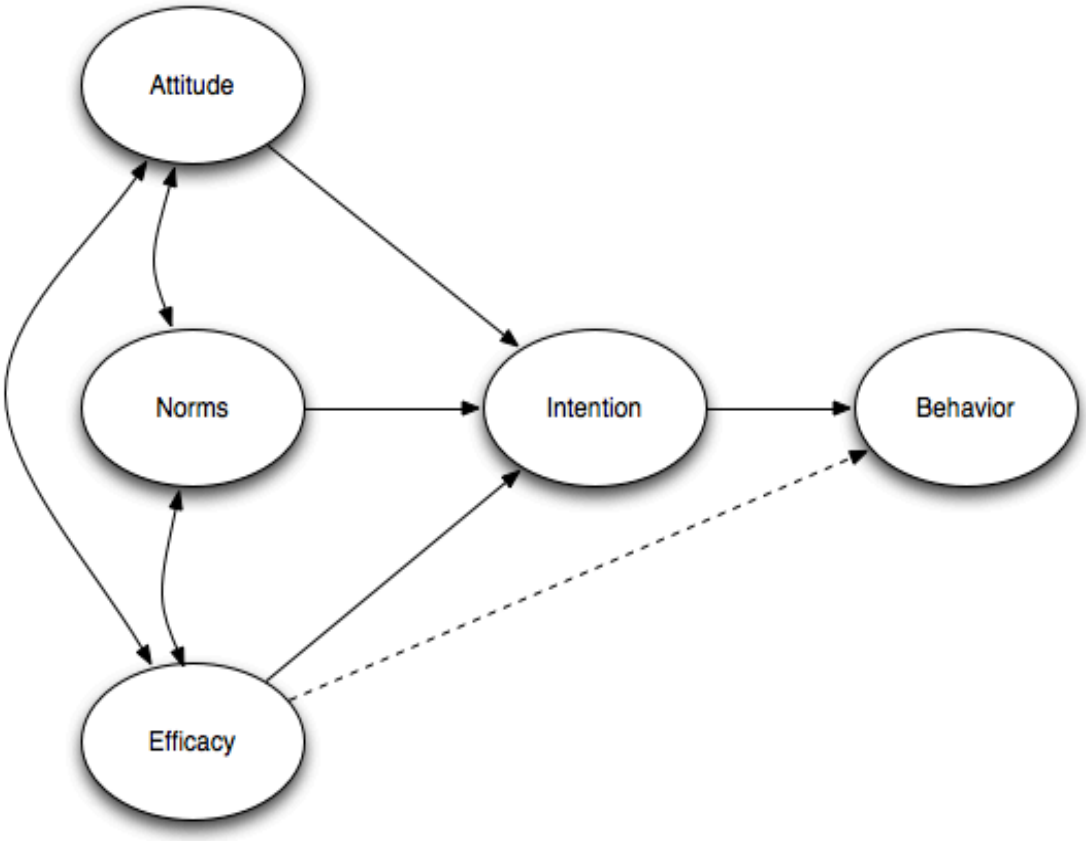
The behavioral impact of memorable messages has also been studied in the context of final conversations (Keeley, 2004), aging (Holladay, 2002), gendered socialization (Dallimore, 2003), breast cancer detection and prevention (Smith et al., 2009), and employee socialization in organizations (Stohl, 1986). For example, in a study examining the effects of memorable messages on behavior, Holladay (2002) found that memorable messages about aging had a general impact on either forming positive or negative attitudes as a result of receiving the message. In addition, Smith and colleagues (2009) found that in the context of breast cancer memorable messages, the topics and sources (i.e., friend, family, media, or medical professional) of memorable messages about breast cancer were likely to motivate prevention and detection behaviors, with the exception of medical professionals, which were less likely to motivate prevention behaviors in respondents. Together, these findings suggest that recalling a memorable message may also influence behavior in the context of MPS. Further, behaviors are also associated with attitudes, normative beliefs, and efficacy beliefs (Fishbein & Yzer, 2003;

Montaño & Kasprzyk, 2008). As such, this research is also uses the literature about health behavior theories to further explore the role of memorable messages about stimulants in behavioral intention.

THEORY OF PLANNED BEHAVIOR

Applying a theory focused on health behavior to the context of illicit stimulant use among undergraduates can provide a framework that identifies potential enabling forces for the behavior. The present discussion considers the Theory of Planned Behavior (Ajzen & Fishbein, 1980; Ajzen, 1985, 1991) as relevant to the investigation of memorable messages about prescription stimulants and behavioral intention among college undergraduates. TPB is an extension of the theory of reasoned action and describes the influences on a person's decision to engage in a behavior (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975). A central tenet of TPB is that an individual forms an intention before engaging in a behavior, and the behavior can be predicted by the intention to perform the behavior (Ajzen, 1985, 1991). Behavioral intentions are formed through an individual's attitude toward performing the behavior, subjective norms, and efficacy beliefs (see Figure 1).

Figure 1. The Theory of Planned Behavior.



Attitude, the degree to which a person has an (un)favorable appraisal of the behavior of interest, influences behavioral intention in that if individuals have a more favorable attitude toward the behavior, they will be more likely to perform that behavior (Ajzen, 1985, 1991). Attitudes are predispositions that are assumed to include past experiences (Fishbein & Ajzen, 1975) and a function of outcome evaluations and beliefs. Outcome evaluations include the positive or negative appraisal of the consequences of the behavior while beliefs include the probability that engaging in the behavior will result in specific consequences (Fishbein & Ajzen, 1975).

Subjective norms, the perceived social pressure to (dis)engage in the behavior, are formed through the beliefs held about the behavior by individuals' referent group (i.e., friends, family) and their motivation to comply with those beliefs (Ajzen, 1985, 1991). The theory suggests that people are more likely to conform to the opinions of members of their referent group who engage in the behavior (Ajzen, 1985, 1991). If individuals value the opinion of the referent group and are motivated to comply with the opinion of that group, the resulting subjective norms will increase the likelihood that they will engage in the behavior (Ajzen, 1985, 1991).

Finally, efficacy, or perceived behavioral control, is conceptualized as the perceived ease or difficulty in performing the behavior, reflecting both past experience and anticipated barriers to starting or stopping the behavior (Bergstrom & Neighbors, 2006). Efficacy is also directly related to the decision to enact or refrain from the behavior (Ajzen, 1985, 1991). Individuals' level of perceived behavioral control depends on the person and the situation specific to the behavior (Ajzen, 1985, 1991). If people perceive themselves to have a sufficient level of actual control over the behavior, there is an expectation to carry out their behavioral intentions when an opportunity presents itself (Ajzen, 2002).

TBP would predict that students who believe MPS is safe and effective (attitudes), believe their friends, or peers, perceive MPS as appropriate (subjective norms), and believe that stimulants are possible to obtain (efficacy) would have greater intentions to engage in MPS. As an example of this, Judson and Langdon (2009) found that illicit stimulant users had lower scores regarding concerns about adverse health

effects and ethics of use, higher scores relating to the social acceptability of stimulant use, and higher scores relating to the need to use stimulants as a study aid. Although illicit stimulant use is typically an independent activity (e.g., a student takes a pill before going to the library to study), research suggests that engaging in MPS is socially acceptable (Ford & Schroeder, 2009), and norms are understood through social interaction as they are disseminated through communication (Kincaid, 2004; Lapinski & Rimal, 2005). Therefore the following hypothesis is offered:

Hypothesis 1: Favorable attitudes, perceived norms that others are engaging in MPS, and efficacy will positively predict behavioral intentions to engage in MPS.

The relative contribution of these three theoretical constructs can vary between behaviors and populations (Fishbein & Yzer, 2003; Montaño & Kasprzyk, 2008), therefore it is helpful to determine the degree to which the intention to engage in MPS is associated with attitude, perceived norms, and efficacy. Identifying the construct most related to behavioral intention can focus the aim and scope of future intervention messages (Fishbein & Cappella, 2006; von Haeften, Fishbein, Kaspryzk, & Montaño, 2001). As such, understanding the contribution of each of the TBP constructs is necessary to target behavior change. For example, research has identified that some behaviors are primarily under attitudinal control (Albarracin et al., 2003) while others are under normative control (Albarracin, Kumkale, & Johnson, 2004) or perceived control (Albarracin et al., 2005; Yzer, 2007). To assess the relative contribution of the three theoretical constructs in the population of undergraduate students at a large Southern university, the following research question is posed:

Research Question 6: What is the relative contribution of attitude, perceived norms, and efficacy in predicting MPS intentions among college undergraduates?

MEMORABLE MESSAGES AS PREDICTORS OF PLANNED BEHAVIOR

According to TPB, the single best predictor of individuals behavior is the intention to perform that behavior, which is a comprised of attitudes toward performing the behavior, the subjective norm that expresses individuals' perception of relevant others, and efficacy that expresses individuals' perception of ease or difficulty in carrying out the behavior (Ajzen, 1985, 1991). However, it is important to consider how people arrive at their attitudes, norms, and efficacy in the context of MPS, and examining memorable messages about MPS can be a helpful strategy to explore this path. As suggested by TPB, it is individuals' perceptions of the attitudes and behaviors of network members, rather than the actual behaviors of those peers that exert the strongest influence in engaging in deviant behavior (Duan et al., 2009). Thus, memorable messages are important to consider in understanding what leads to attitudes, norms, and efficacy beliefs about MPS.

For example, if a student is a member of an organization that engages in illicit stimulant use and views it as a norm among the members, the student may be more likely to endorse illicit stimulant use, and may intend to engage in MPS. Although scholarship does suggest that people overestimate the extent to which their peers are engaging in deviant behavior, as well as their positivity towards the behavior (Urberg, Cheng, & Shyi, 1991), research has consistently shown that college students report knowing someone who has used stimulants recreationally (Carroll, McLaughlin, & Blake, 2006; Hall et al.,

2005). Scholarship further demonstrates that after using substances, outcome expectations are reinforced and intensified, and as a result, people who use hold stronger expectancies than those who use less frequently (Goldman, Del Bocca, & Drakes, 1999; Stacy, Leigh, & Weingardt, 1994). Thus, those students who have engaged in MPS previously may share different messages with their peers and friends about its effects than those students who have not engaged in MPS. However, people do not need to use substances to have expectations about their effects as expectancies also develop from experience from social network members or acquired knowledge from one's peer group (Scheier & Botvin, 1997).

These findings point specifically to the warrant of the current study. By exploring the memorable messages that are shared between undergraduates about illicit stimulant use, researchers can better understand how attitudes, norms, and efficacy are shaped and how these constructs influence intentions, and ultimately behavior. Though conversations about stimulants have not been explored in the literature, researchers have studied the influence of communication processes on alcohol consumption by examining the role of communication networks (Dorsey, Scherer, & Real, 1999), persuasion strategies (Harrington, 1997), and family communication (Booth-Butterfield & Sidelinger, 1998). Lo and Globettit (1993) found a relationship between what students were discussing with friends and their alcohol consumption, and Real and Rimal (2007) explored the role of peer communication patterns in the relationship between normative beliefs and drinking behaviors among college undergraduates. They found that peer communication was a significant predictor of intention to consume alcohol, and further, that the relationship

between descriptive norms and alcohol consumption was stronger among students who engaged in more communication about those behaviors with their peers than those who did not (Real & Rimal, 2007). It seems likely then, that communication—specifically memorable messages—plays a central role in forming attitudes, norms, efficacy beliefs, and ultimately influences behavior.

Because memorable messages guide behavior (Smith et al., 2009) and self-assessment of behavior (Ellis & Smith, 2004; Smith & Ellis, 2001; Smith et al., 2001), and because behavior is influenced by attitude, perceived norms, and perceived efficacy (Fishbein & Yzer, 2003), the themes of memorable messages may directly influence attitudes, norms, and efficacy. For example, if people receive a memorable message from a friend or peer that states "stimulants help you stay awake to study", and the individuals believe that performing the behavior (i.e., MPS) will lead to "good" outcomes and prevent "bad" outcomes, such as staying awake to study for an exam, the more favorable their attitude towards engaging in MPS should be relatively favorable. If individuals believe that select others think they should perform the behavior, they should be more motivated to comply with those others, and thus, the norm to perform the behavior should be stronger. If individuals also perceive that they can perform the behavior, their self-efficacy should be stronger as well (see Fishbein & Yzer, 2003).

Together, it seems clear that messages shared from specific others can inform individuals' attitudes, norms, and efficacy, and memorable messages provides a framework to explore which message features predict these constructs. Through memorable messages, students may form attitudes and normative beliefs, and learn about

the perceived potential benefits of MPS and develop a positive expectation for its use, thus being at a higher risk for use. Likewise, students may learn about negative outcomes or side effects from using stimulants and develop negative expectations for its use, thus being at a lower risk for engaging in the behavior. Further, when asked to recall behaviors that exceeded or violated personal expectations for themselves and the memorable messages invoked by these behaviors, Smith and Ellis (2001) found that there is a relationship between the categories of recalled behaviors, the valence of the behaviors, and the categories of recalled memorable messages. Together, understanding the associations among memorable messages and behavioral outcomes (e.g., intention to use or actual use of prescription stimulants) may be helpful guiding the future creation of effective health promotion messages. Based on the literature of memorable messages and the Theory of Planned Behavior discussed above, the following research questions are offered:

Research Question 7: How are the features of memorable messages (found in RQs 1-3) related to (a) attitudes, (b) perceived norms, and (c) efficacy regarding MPS among college undergraduates?

Research Question 8: What themes in the memorable messages are predictors of behavioral intention to use stimulants?

Research Question 9: Do (a) attitudes, (b) normative beliefs, or (c) efficacy change as a result of receiving memorable messages about stimulants?

This study also assesses the use of stimulants. Fishbein and Ajzen (1975) state, "the ultimate test of the theory rests upon its ability to guide the development of effective

behavioral change interventions" (p. 24). Because TBP suggests that behavioral intention is the immediate antecedent of behavior and behavior is primarily determined by the strength of the behavioral intention (Ajzen, 1985, 1991; Fishbein & Yzer, 2003), the following hypothesis is posed:

> **Hypothesis 2**: Intentions to use MPS at the beginning of the semester are positively associated with behavioral use at the end of the semester.

THE MODERATING ROLE OF RELATIONAL CLOSENESS AND SIMILARITY

Because undergraduates form friendships with likeminded others, it is likely that the conversations about stimulants among undergraduates vary depending on the members of the peer group having the conversation. During college, friends and peers may influence the attitudes, normative beliefs, and perceived behavioral control regarding self-efficacy and perceived motivation to use stimulants of undergraduates. Social learning theory (Akers, 1985) suggests that context for learning deviant behavior is established by social and peer groups. Associations that occur early in life (priority), more often (frequency), for a longer period of time (duration), and are more salient to the person (intensity) have the greatest influence on the learning process (Ford, 2008). Therefore, it seems plausible that conversations about MPS with a long-time friend from high school, for example, would carry more influence than a conversation with a new college friend. As such, it is likely that the memorable messages undergraduates report may have different influences on behavioral intentions and actual behavior, depending on the characteristics of the sender of that message. Because of the central role that

friendship plays in emerging adulthood, it is necessary to further evaluate effects of messages from friends and on undergraduates' health decisions and behaviors.

In the context of MPS, undergraduates may receive a message from a friend, roommate, or classmate that highlights the perceived benefits of using stimulants to help them reach their academic goals. The undergraduates may also receive a message from another peer or friend that attempts to dissuade them from engaging in MPS. Research thus needs to empirically examine the features of these messages that carry more weight in predicting intention to use stimulants. One strategy to explore this is through examining the moderating role of relational closeness and similarity.

When examining the role of friendship and peers in illicit stimulant use, it is important to note that a friend may be motivated to nurture and encourage the behavior rather than punish or discourage it, in part due to the expectations of how a friend should behave (Burleson & Samter, 1994). A message that reinforces illicit stimulant use may parallel both the characteristics of friendship (e.g., "A friend is accepting of who I am no matter what;" Reohr, 1991) and the similarity of the friends (e.g., "We participate in the same risky behavior or have similar beliefs about the behavior;" Jaccard et al., 2005). In these circumstances, if individuals feel good about the prospect of engaging in illicit stimulant use, and perceives they are close to the sender of the memorable message and are similar to that individual, they may have stronger intentions to engage in MPS.

Research examining the communication of illicit stimulant use and decision-making among friends is limited (Morse et al., 2012), however scholarship suggests that seeking information may reduce the risk of making bad decisions (Zeelenberg, 1999).

Informational support includes “messages that make recommendations about what to do, think, or feel in response to a problematic situation” (MacGeorge, Feng, & Burleson, 2011, p. 335). Because factors such as source competency, trustworthiness, and expressed confidence positively influence receiving informational support, and similarity, closeness, and liking between conversational partners is related to advice outcomes (Bonaccio & Dalal, 2010; Feng & MacGeorge, 2006), it is likely that undergraduates strategically choose who to talk about their actual or desired stimulant use. However, these conversations may be sensitive, stigmatizing, or face threatening for the participants. Morse and colleagues (2012) argue that if individuals are interested in trying stimulants in response to a stressful situation, and perceive positive outcomes from seeking advice from friends, they are more likely to believe that they could cope with the possible ramifications of discussing the topic with their friend (Morse et al., 2012). Therefore, the final research questions are posed:

Research Question 10: Are the associations between (a) attitude, (b) perceived norms, or (c) efficacy and (d) intention to use moderated by relational closeness?

Research Question 11: Are the associations between (a) attitude, (b) perceived norms, or (c) efficacy and (d) intention to use moderated by similarity?

STUDY OVERVIEW

The proposed study is designed to investigate the context and features of memorable messages about illicit stimulant use among college undergraduates. Due to the dearth of communication scholarship exploring the conversational features of memorable messages exchanged about illicit stimulants, the goal of this research is to

broaden the scope of communication research that occurs within this specific health context.

Guided by the theoretical frameworks of memorable messages (Knapp et al., 1981) and the Theory of Planned Behavior (Ajzen & Fishbein, 1980; Ajzen, 1985; 1991), the present research seeks to accomplish three goals: (1) examine the content, sources, and valence of memorable messages about stimulants shared among undergraduates; (2) examine how those characteristics of memorable messages are related to behavioral outcomes directly as well as indirectly through changes in attitudes, normative beliefs, and efficacy; and (3) examine if receiving a memorable message predicts changes in intention to engage in MPS.

To reach these aims, three studies were conducted: a pilot study, the primary study, and the follow up study. The pilot study employed in an open-ended survey format and determined that participants were able to recall memorable messages about MPS. Results of the pilot study are described in Chapter Three.

The primary study had two main parts. Part one asked participants to provide a memorable message they received regarding MPS. Following this, participants were asked to report a variety a characteristics about the sender of the message, as well as other message features. Because scholarship demonstrates that students perceive stimulants to be safer and more socially acceptable than other illicit drugs (Ford & Schroeder, 2009), part two of the primary study focused on the variables included in the Theory of Planned Behavior (Ajzen & Fishbein, 1980; Ajzen 1991, 2002), specifically

exploring how participants' attitudes, beliefs about social norms, and efficacy work together to create intentions which predict health related behavior, in this study, MPS.

The follow-up study reassessed the Theory of Planned Behavioral variables, to determine if there is change over time in attitudes, norms, or perceived control. Participants were also asked to report on any memorable messages they may have received from Time 1 to determine if attitudes, norms, and perceived control changed as a result of the memorable message. The data from the follow-up study were also used to determine if intentions reported from the primary study lead to behavior as reported in the follow-up study.

Chapter Three describes the participants, procedures, and results of the pilot study, as well as the methodology for the primary and follow-up studies while Chapter Four describes results from the qualitative analysis. Chapter Five presents the plan of analysis and quantitative results for the primary and follow-up studies.

Chapter Three: Methodology

OVERVIEW

This dissertation research was developed to investigate the associations among the features of memorable messages about prescription stimulants, attitudes, normative beliefs, efficacy, closeness, similarity, and behavioral intention. This study was designed as a self-report using a self-guided online questionnaire in which participants could begin the survey at their choosing. The advantages of self-report methods include that they are easy to administer, are convenient for the researcher and the participant, and provide richness of information (Charania & Ickes, 2006; Paulhus & Vazire, 2009; Harvey, Christensen, & McClintock, 1983; Lucas & Baird, 2006), all of which were advantageous to this project. Next, the procedures, participants, and results of the pilot study are described. Then, this chapter provides an overview of the participants and procedures for the primary and follow-up studies.

PILOT STUDY: MEMORABLE MESSAGE RECALL

The goal of the pilot study was to determine the potential of the full study by assessing whether or not college students could recall a memorable message about prescription stimulants. Data collection for the pilot study occurred in the Fall semester of 2013. The procedures and participants of the pilot study are described next.

Procedures

After receiving IRB approval (see Appendix A), a questionnaire was developed using Qualtrics software, and was posted online for an approximate duration of one month. The survey took participants 15-20 minutes to complete. Before filling out the

questionnaire, participants were presented with informed consent document as well as the contact information of the researcher. After granting consent, participants were provided with a brief description of the study (i.e., "This study explores conversations about non-medical use of prescription stimulants, specifically those medications used to manage ADD/ADHD [e.g., Vyvnase, Concerta, Adderall, Riatlin, etc.]") and a definition of memorable messages (i.e., "Memorable messages are verbal statements that have been told to you which you may remember for a long period of time, or has stuck with you in some way. These statements may also have influenced your life in some way."). Participants were then asked if they could recall a memorable message related to the non-medical use of prescription stimulants. If participants selected "Yes" they were directed to a series of questions about the memorable message; if they answered "No" they were directed to a series of questions about a recent conversation about the non-medical use of prescription stimulants. The two versions of the survey (memorable messages and recent conversation) were parallel and asked the same questions.

Participants

A sample of 107 participants (27 males, 79 females, 1 declined to report sex) who were at least 18 years of age were surveyed for this study. Participants averaged 20.34 (*SD* = 2.25) years of age and ranged from 18 to 33 years of age. Participants were recruited from several lower and upper division communication and advertising courses at the University and were offered extra credit points for their participation. Ethnicities of the sample included: 61 (57%) Caucasian, 15 (14%) Latino/a or Hispanic, 12 (11.2%)

Asian or Pacific Islander, 10 (9.3%) Black or African American, seven (6.5%) other or multiple ethnicities, and two (1.9%) declined to respond.

The sample was comprised of 36 seniors (33.6%), followed by 32 juniors (29.9%), 25 sophomores (22.4%), and 14 freshmen (13.1%). A majority of the participants were Communication majors (*n* = 54, 50.5%), followed by 15 (14.0%) Natural Science majors, 14 (13.1%) Liberal Arts majors, eight (7.5%) Education majors, seven (5.6%) Business majors, four (3.7%) Undergraduate Studies majors, two (1.9%) Engineering majors, two (1.6%) undeclared, and one (0.9%) Nursing major. A majority of the sample (*n* = 80, 74.8%) reported no affiliation to Greek membership, eight (7.5%) participants reported being a member of a fraternity, 14 (13.1%) were a member of a sorority, and five (4.0%) declined to answer. Seventy-three (68.2%) of the participants reported living in an off-campus apartment or house, 20 (18.7%) lived on-campus, seven (6.5%) lived in an off-campus dorm or residence hall, four (3.7%) lived at home with parents, and three (2.8%) reported other living arrangements including student cooperatives and a sorority house.

Participants were asked if students they knew at the University (not including themselves) had ever used prescription stimulants that were not prescribed to them since coming to college. The majority of participants (*n* = 73, 68.2%) reported they did know someone who had engaged in MPS at the University, while 34 (31.8%) said they did not know anyone who engaged in MPS. When asked how many students they personally knew at the who had taken stimulants without a prescription for academic motives, the majority (*n* = 45, 42.1%) said that they personally knew 1-5 students who engaged in

MPS, with eight (7.5%) reporting they knew 6-10 students who engaged in MPS, 24 (22.4%) reporting that they knew more than 10 students at the University illicitly using stimulants, and 30 (28%) reported they did not know anyone who engaged in MPS. When asked about their *perceptions* of the percentage of *misuse* at the University to enhance academic performance, 35 (32.7%) participants reported that they believe 10-25% of students misuse prescription stimulants, 32 (29.9%) reported that between 26-50% of students at the University engage in MPS, while 15 (14.0%) reported that they believed 51-75% of students misuse prescription stimulants, two (1.9%) believe that 76-100% of students engaged in MPS, and 16 (15.0%) reported that less than 10% misuse stimulants with seven (6.5%) reporting that they perceive no students misuse stimulants at the University. The majority of participants also reported that prescription stimulants were easy to obtain at the University (*n* = 24, 22.4% "very easy", *n* = 45, 42.1% "somewhat easy").

Further, 45 (42.1%) students reported they had thought about using stimulants while being enrolled at the University. The majority of the sample (*n* = 67, 62.6%) reported that they would definitely *not* be likely to use prescription stimulants within the next 12 months; however, 17 (15.9%) reported it would be somewhat unlikely and four (3.7%) reported it would be somewhat likely that they would engage in MPS within the next 12 months (*n* = 19, 17.8% declined to respond). When asked about their personal use of prescription stimulants, 23 (21.5%) participants reported having personally used prescription stimulants for nonmedical reasons since coming to college, and 19 (17.8%) reported using stimulants within the past 12 months. Of the 19 participants reporting use

within the last year, 12 (63.2%) participants reported occasional use, four (21.1%) reported using stimulants a few times a month, two (10.5%) reported using stimulants once a month, and one participant (5.3%) reported weekly use. The majority of participants who reported use within the previous 12 months reported purchasing stimulants (n = 10, 52.6%), seven (36.8%) participants reported obtaining the stimulants for free, and two (10.5%) reported obtaining it from other sources.

Memorable Messages or Recent Conversations

To complete the open-ended portion of the survey, participants were asked to write down any memorable message, or recent conversation, they had received and could recall that had a lasting impression on them. The questionnaire asked participants to report up to three memorable messages. Overall, 55 (51.4%) participants reported at least one memorable message, with 5 reporting two memorable messages (4.7%); the remaining 52 (48.6%) participants (i.e., those who could not recall a memorable message) were asked to report on one recent conversation about the nonmedical use of prescription stimulants. Consistent with other memorable message research (Barge & Schlueter, 2004; Holladay, 2002; Knapp et al., 1981; Stohl, 1986), participants were asked how certain they were that they recalled the exact wording of each memorable message (or the recent conversation) on a three-point scale (1 = *certain*, 2 = *moderately certain*, 3 = *uncertain*); items were reverse coded so that the higher value indicated more certainty. Participants reported that they were moderately certain about the wording of the memorable message (M = 1.85, SD = 0.74). This average aligns with existing research assessing certainty of memorable message wording (see Heisler & Ellis, 2008; Nazione et al, 2011).

The findings of the pilot study show that a sizeable portion of undergraduate students has experienced memorable messages about MPS, and about a fifth of the sample have reported potential intentions for future MPS, and thus, examination of the hypotheses and research questions was possible and warranted. Next, the procedures and participants of the primary study are described.

PRIMARY STUDY

Participants and Procedures

A total sample of 315 participants who were at least 18 years of age responded to the call for the primary study examining messages about prescription stimulants (see Appendix B). Of these 315 participants, 137 participants (25 males, 112 females) reported a memorable message, and were retained for analyses in the primary study. Participants were recruited from the participant pools in the Department of Advertising and Public Relations (n = 66), as well as the Department of Communication Studies (n = 71).

Participants completed the online questionnaire during October 2014 and received course credit for participation. After granting consent (see Appendix C), the beginning of the initial questionnaire asked participants to create a unique identification code they could use to complete the follow-up survey. This unique identifier was used to attach their responses for the initial and follow-up questionnaire to organize the data. Demographic information for these 137 participants is provided next.

Participants averaged 20.14 (SD = 1.73) years of age and ranged from 18 to 33 years of age. Participants were recruited from several lower and upper division

communication and advertising courses at the University and were offered extra credit points for their participation. The majority of participants (*n* = 122, 89.1%) reported that they did not have a prescription for prescription stimulants, while 15 (10.9%) reported they had a current prescription for stimulant medication.

Ethnicities of the sample included: 91 (66.4%) Caucasian, 18 (13.1%) Latino/a or Hispanic, 12 (8.8%) Asian or Pacific Islander, 4 (2.9%) Black or African American, 11 (8.0%) other or biracial and/or multiple ethnicities, and one (0.7%) declined to respond. When asked to describe their year in school, 19 participants reported they were of freshman status (13.9%), 30 (21.9%) sophomores, followed by 50 juniors (36.5%), and 38 seniors (27.7%). A majority of the participants were Communication majors (*n* = 96, 70.1%), followed by 14 (10.2%) Liberal Arts majors, 11 (8.0%) Natural Science majors, eight (5.8%) Undergraduate Studies majors, four (2.9%) Business majors, three (2.2%) Engineering majors, and one (0.7%) Pharmacy major. A majority of the sample (*n* = 90, 65.7%) reported no affiliation to Greek membership, 29.2% (*n* = 40) were a member of a sorority, and 5.1% (*n* = 7) participants reported being a member of a fraternity. Ninety-eight (71.5%) participants reported living in an off-campus apartment or house, 17 (12.4%) lived on-campus, 17 (12.4%) lived in an off-campus dorm or residence hall, three (2.2%) lived at home with parents, and two (1.5%) reported other living arrangements, specifically, a sorority house. Three participants (2.2%) reported they were student veterans.

Participants were asked about the perceived harmfulness of MPS by having them rank order a variety of drugs (1 = *most harmful*, 13 = *least harmful*). Types of drugs were

collected from the University's Health Services website. Overall, participants rated MPS fairly low on perceived harmfulness (*M* = 9.75, *SD* = 2.31), or as 10 out of 13 (see Table 1 for all ratings).

Table 1. Means and Standard Deviations of Perceived Harmfulness of Drugs

Drug	**Mean**	**SD**
Methamphetamines (i.e., crystal meth, ice, crank)	1.98	2.09
Opiates (i.e., heroin, smack)	3.07	2.09
Cocaine	3.87	2.30
Hallucinogens (i.e., LSD, PCP)	5.24	2.78
MDMA (i.e., Ecstasy, Molly)	5.72	2.05
Club Drugs (i.e., GHB, Ketamine, Rohypnol)	5.96	2.05
Sedatives	6.75	2.59
Inhalants	7.16	2.10
Steroids	9.04	2.52
Prescription Stimulants used without a Prescription (i.e., Adderall, Ritalin, Vyvanse, Concerta)	9.75	2.31
Tobacco	10.47	2.38
Alcohol	10.51	2.45
Marijuana	11.48	2.31

To determine whether participants perceived using prescription stimulants gives students an unfair advantage fair, a 4-item measure was created for the primary study. Items included: "It is fair for students at the University to use prescription stimulants that

they do not have a prescription for"; "Students who use prescription stimulants without a prescription at the University have an unfair advantage"; "If a student takes a prescription stimulant without a prescription, they are cheating"; and "Students who use stimulants without a prescription with the intent of bettering their grades are being academically dishonest" (see Appendix D). Responses were solicited on a seven point Likert-type scale, ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). A composite variable was created by averaging the score on each individual item, and one item was reverse coded, so that a higher score indicated stronger perceptions of an unfair advantage. Overall, the items demonstrated good reliability: α = .85. In total, students perceived MPS to be somewhat unfair (M = 4.37, SD = 1.48).

When asked if they had *ever* taken prescription stimulants that were not prescribed to them, 72 (52.6%) reported that they had engaged in MPS while 65 (47.4%) reported they had not ever used prescription stimulants. For those participants who reported ever use of MPS, the average age of first use was 17.3 (SD = 2.58). When asked if they had engaged in MPS since coming to college, 51 (37.2%) answered yes, while 86 (62.8%) reported they had not engaged in MPS since coming to the University. For those 51 students who said they had used stimulants while being in college, the majority (n = 35, 70%) reported occasional use, while six (12.0%) reported use a few times a month and two (4.0%) reported use once a month. Three participants (6.0%) reported use multiple times a week, and three (6.0%) reported engaging in MPS once a week. When asked how they usually obtain prescription stimulants, 27 (52.9%) reported it was free, 18

(35.3%) reported they bought it, and five (9.0%) reported specifically that a friend had given them the medication.

Further, of those 86 who reported they had not engaged in MPS since coming to the University, 45 (32.8%) students reported they had thought about using stimulants while being enrolled at the University. The majority of the sample who had thought about use (*n* = 48, 57.1%) reported that they would definitely *not* be likely to use prescription stimulants *once or twice* within the next 12 months; with 13 (15.5%) reporting they were somewhat unlikely to use prescription stimulants. Additionally, 13 (15.5%) reported they were unsure, and eight (9.5%) reported it would be somewhat likely that they would engage in MPS within the next 12 months, and 2 (2.4%) said the definitely would use prescription stimulants in the next 12 months. Finally, when asked if they would use prescription stimulants *regularly* in the next 12 months, 65 (77.4%) reported they definitely would *not*; with 5 (6.0%) reporting they were somewhat unlikely to use prescription stimulants regularly. Seven (8.3%) were unsure, six (7.1%) reported it would be somewhat likely that they would regularly use, and 1 (1.2%) reported definite regular use in the next 12 months, see Table 2.

Table 2: MPS Descriptive Statistics (*n* = 137)

Demographic Characteristic	**N**	**% of sample**
Lifetime Prior Use	72	52.6%
College Prior Use	51	37.2%
Occasional use in College	35	70%
Use a few times a month in College	6	12%
Use once a month in College	2	4%
Use multiple times a week in College	3	6%
Use once per week in College	3	6%
College Never Use	84	61.3%
Thought about use during the next 12 months	45	32.8%
Would be somewhat unlikely to use once or twice in the next 12 months	13	15.5%
Unsure about use once or twice during the next 12 months	13	15.5%
Somewhat likely to use once or twice during College	8	9.5%

Next, the procedures and participants for the follow-up study are described. Then, a description of the measures utilized in both studies is provided.

FOLLOW-UP STUDY

Procedures

Approximately four weeks later, in November 2014, the follow up study launched through the participant pools in the Department of Advertising and Public Relations and the Department of Communication Studies. Participants were instructed they could only

complete the second study if they completed the first study. After participants consented to participate, they entered the unique identifier they created for the main study to match their two surveys. Then, participants repeated the main questionnaire to assess if their use and/or intention to use, attitudes, normative beliefs and efficacy had changed from the initial survey. Participants also were asked if they have received a memorable message about prescription stimulants since the main study. If they answered yes, they were directed to a series of questions about the message, described previously.

Participants

Of the 137 participants who completed the primary study, 89 participants (24 males, 64 females) completed the follow-up study. Participants were offered additional extra credit for their participation in the second survey. Forty-nine participants were from the Advertising participant pool and 40 were from the Communication Studies participant pool. The average age of the participants was 20.71 years, and ranged from 18-34 years of age. Twenty-seven participants were seniors (30.3%), 28 were juniors (31.5%), 19 were sophomores (21.3%), and 11 (12.4%) were freshman. The majority of the sample were not involved in Greek organizations (n = 70, 78.7%). Four participants had a current prescription for prescription stimulants, while the majority of the sample (n = 85, 95.5%) did not. Additionally, 47 participants (52.8%) reported they had previously engaged in MPS.

An additional 15 participants (3 males, 12 females) who did not report a memorable message at Time 1, but did report a memorable message at Time 2 were included for analysis of change over time on the TPB variables (RQ 9). The average age

of these participants was 20.86 (*SD* = 2.54), ranging from 18 to 28. Seven participants were seniors (46.7%), four juniors (26.7%), two sophomores (13.3%), and two freshmen (13.3%). Six participants (40%) reported prior use of prescription stimulants. Ethnicities of these additional 15 participants included: 7 (46.7%) Caucasian, 6 (40.0%) Latino/a or Hispanic, and 2 (13.3%) Asian or Pacific Islander.

DATA COLLECTION FOR THE PRIMARY AND FOLLOW-UP STUDIES

The online questionnaire consisted of four primary sections: (1) memorable messages or recent conversations about stimulants, (2) quantitative measures related to TPB, (3) relational closeness, and control variables, and (4) basic demographic information which was only collected during the primary study. Participants were provided with an overview of the study (e.g., "This study explores conversations about the non-medical use of prescription stimulants [medications used to manage ADD/ADHD, e.g., Vyvanse, Concerta, Adderall, Ritalin, etc.]), and were given a definition of MPS (e.g., "The non-medical use of prescription stimulants occurs when someone uses ADD/ADHD medication without a prescription in their name from a doctor.").

Next, participants were asked if they could recall a memorable message, if they selected "yes" they were directed to the memorable message portion of the questionnaire. Then, they completed items about relational closeness and similarity to the message sender. Next, they were directed to the measures related to TPB, and the order of the question blocks was randomized to assess attitudes, norms, and efficacy. Then, participants reported their behavioral intentions to engage in MPS. Next, participants

completed a series of control measures—the order of the question blocks were randomized to assess fairness of use, sensation seeking, and internal restlessness. Finally, participants completed demographic information (see Appendix E).

If participants reported “no” to the memorable message recall question, they were directed to a question about recent conversations. If they indicated they could recall a recent conversation, they completed the same battery of questions described above, in the same order. If the participant indicated they could not recall a memorable message or a recent conversation, they were immediately directed to the TPB questions. Data were collected for both those reporting memorable messages and recent conversations because this study sought to determine if there is a change in the TBP variables as a result of receiving a memorable message during the semester (Research Question 9), and thus the data on the TPB variables was necessary for all participants.

The follow up study followed the same format of the primary study, with participants first being asked to report on a memorable message or recent conversation. If participants could recall either a memorable message or a recent conversation they also completed the relational closeness and TPB measures. If the participants indicated that they had not received a memorable message or recent conversation since Time 1, they were direct to the series of questions focused on the TPB variables. The control variables and demographic items were assessed only at Time 1. At Time 2, participants were asked if they had used prescription stimulants that were not in their name since they completed the first survey to determine behavioral use.

The memorable message and recent conversation questionnaires were parallel, and are described next.

Memorable messages or recent conversations

Participants were provided with the definition of a memorable message (e.g., "Memorable messages are verbal statements that have been told to you which you may remember for a long period of time or has stuck with you in some way. These statements may also have influenced your life in some way."), and were asked if they can recall receiving a memorable message about prescription stimulants (e.g., "Can you recall a memorable message about the non-medical use of prescription stimulants [i.e., using ADHD medication that was not prescribed by a doctor]?).

Participants were asked to provide a description of a memorable message (or recent conversation) they could recall about MPS. Participants reported on one memorable message (or recent conversation) they have received about prescription stimulants. For the memorable message or recent conversation reported, participants were first asked to describe the memorable message or conversation. Consistent with other memorable message research (Barge & Schlueter, 2004; Holladay, 2002; Knapp et al., 1981; Stohl, 1986), participants were also asked how certain they were that they recalled the exact wording of each memorable message (or recent conversation) on a three-point scale (1 = *certain*, 2 = *moderately certain*, 3 = *uncertain*); items were reverse coded so that the higher value indicated more certainty of recalling the memorable message. Overall, participants were fairly certain about the wording of the memorable message (M = 1.90, SD = .73).

Participants were then asked to report the valence of the message, or conversation, on a three-point scale, 1= *positive*, 2 = *neutral*, 3 = *negative*; items were reverse coded so that the higher value indicated a more positive message (M = 1.74 SD = .78). Next, respondents indicated how long ago the memorable message or conversation, occurred, where it occurred, and reported on characteristics about the source of the message including the sender's age, sex, and relationship to recipient. If the participant reported that the sender of the memorable message, or the conversational partner of the recent conversation, was a college student, participants were prompted to report on the sender's major, Greek affiliation, and year in school.

Next, participants were asked to describe the situation surrounding the exchange of the memorable message (or recent conversation) and the factors that led the message sender to share the message. Participants were then asked to describe the setting in which they received the message, describe what they were doing when they received the message, and describe why they believe the person shared the message. All items were open-ended and each individual question was reported with its own text box (see Appendix F).

QUANTITATIVE MEASURES

Unless otherwise noted, all measures were rated on 7-point scales with the anchors *strongly disagree* (1) and *strongly agree* (7). Larger values for a measure indicate a greater magnitude of the variable. For each scale, composite variables were created by averaging the individual items on each respective scale. Reliability for each measure was

assessed at Time 1 and Time 2, but only the reliability coefficients at Time 1 are reported below and are based upon the full sample for the main study (n = 137).

Relational closeness and similarity.

Relational closeness with the sender of the memorable message was assessed with Vangelisti and Caughlin's (1997) 7-item psychological closeness scale and 5-item similarity scale. Responses were solicited on a 7-point Likert-type scale (for closeness, 1 = *Not at all*; 7 =*Very;* for similarity, 1 = *Strongly disagree*; 7 = *Strongly agree*; see Appendix G). The alpha reliabilities were strong for closeness, α = .97, (M = 4.49, SD = 2.02), and similarity, α = .87, (M = 4.37, SD = 1.39).

Theory of planned behavior prediction variables.

To assess variables pertaining to the theory of planned behavior in regards to attitudes, subjective norms, and efficacy towards illicit use of stimulant medications, items were adapted following the recommendations of Ajzen (2002). A 5-item measure assessed attitudes, and responses were solicited on a 7-point semantic differential scale. Items include, "For me to take prescription stimulants that are not prescribed to me while I am enrolled in school is: Harmful – Beneficial," "For me to take prescription stimulants that are not prescribed to me while I am enrolled in school is: Pleasant – Unpleasant," "For me to take prescription stimulants that are not prescribed to me while I am enrolled in school is, "Good – Bad" (see Appendix H). Three items were reverse coded, and the 5-item attitude scale yielded good reliability: α = .91, (M = 2.96, SD = 1.47).

A 5-item Likert-type measure was created based upon the recommendations of Ajzen (2002) to measure norms. Sample items include "Most people who are important

to me think that I should use prescription stimulants that are not prescribed to me," and "The people in my life whose opinions I value would approve of my use of prescription stimulants that are not prescribed to me" (see Appendix I). The scale yielded good reliability (α = .88, *M* = 2.69, *SD* = 1.40).

A 9-item measure was created based upon the recommendations of Ajzen (2002) to measure efficacy. Six items were rated on a 7-point scale ranging from 1 (*strongly agree*) to 7 (*strongly disagree*). Sample items include, "I am capable of getting prescription stimulants (e.g., Adderall, Ritalin, Vyvanse, Concerta)," "I am capable of resisting taking prescription stimulants that are not prescribed to me if it was offered to me from a friend," and "If I wanted to, I could take prescription stimulants that are not prescribed to me while I am enrolled in school." These six items were reverse coded so that higher values indicated higher control. Additionally, three items were solicited on a 7-point semantic differential scale. Items include: "For me to use prescription stimulants that are not prescribed to me while I am enrolled in school would be: Impossible-Possible," "If I wanted to, I could take prescription stimulants that are not prescribed to me while I am enrolled in school: Definitely true-Definitely not true," and "How much control do you believe you have over taking prescription stimulants that are not prescribed to you while enrolled at UT: Complete Control-No Control" (see Appendix G). Two items were reverse-coded so that higher values indicated more control. Together, the reliability for the nine-item scale was adequate (α = .72, *M* = 5.60, *SD* = .92).

Behavioral intention was assessed with two items adapted from Norman and colleagues' (2007) who examined binge drinking intentions in their application of the theory of planned behavior, as well as one item from adapted from Ajzen's (2002) guide for constructing a TPB questionnaire. The items (modified for the current behavior) are as follows: "I would use prescription stimulants that were not prescribed to me," "I intend to take prescription stimulants that are not prescribed to me while I am in in school," and "I will try prescription stimulants that are not prescribed to me while I am in school" (see Appendix H). The items demonstrated good reliability (α = .92, *M* = 3.32, *SD* = 1.99).

Control Variables

The control variables were only assessed at Time 1. The alpha reliabilities reported below are based upon the full sample for the main study (*n* = 137).

Internal restlessness.

To measure attention problems, the Internal Restlessness Scale (IRS; Weyandt et al., 2003), a self-report measure designed to assess internal or mental restlessness, was employed. The 24 items of the IRS (see Appendix I) are based on a 7-point Likert-type scale (ranging from 1=*none of the time* to 7=*all of the time*), and includes four factors: internal distractibility, internal restlessness, internal impulsivity, and internal disorganization (Weyandt et al., 2003). The alpha reliability was 0.94 (*M* = 4.23, *SD* = 1.06).

Sensation seeking.

Sensation seeking has been shown to be a strong predictor of individuals' involvement in risk behaviors (e.g., reckless driving, drinking, and illicit drug use; Hoyle,

Fejfar, & Miller, 2000; Lonczak, Neighbors, & Donovan, 2007; Trost, Langan, & Kellar-Guenterh, 1999; Yanovitzkky, 2005, 2006). Checton and Greene (2010) found that students who reported prior illicit prescription stimulant use scored significantly higher in sensation seeking. Further, Yanovitzky (2005) found that sensation seeking directly and indirectly predicted drug use by the way it shapes interactions with peers. Participants' preference for novel experiences and their willingness to engage in physical and social risks was measured using the Brief Sensation Seeking Scale (BSSS; Hoyle, Stephenson, Plamgreen, Lorch, & Donohew, 2002). The BSSS includes 8 items with responses ranging from (1) *strongly disagree* to (5) *strongly agree* (see Appendix J). The alpha reliability was 0.83, (M = 4.46, SD = 1.24).

Chapter Four: Qualitative Results

This research sought to examine the content of memorable messages undergraduates reported about MPS. Next, a description of the qualitative analyses used to assess Research Question 1 is presented.

QUALITATIVE ANALYSIS

Themes of Memorable Messages

Research Question 1 asked about the themes or topics of memorable messages about MPS. The open-ended responses that participants provided when instructed to "Please type the memorable message you recall about the non-medical use of prescription stimulants. Please use exact words, if possible" served as the raw data for this study, which was analyzed using a qualitative thematic analysis (Smith, 1995). The unit of analysis for this study was the individual memorable message. This qualitative analysis was conducted from an interpretive approach, following the recommendations to generate themes as described by Owen (1984). Inductive analysis was conducted by thematic analysis to unitize the data into themes (Bulmer, 1979; Owen, 1984), and the goal of this analysis as to create "an analysis of thematic content, arrived at by inductive reasoning" that provides "a detailed, comprehensive, and valid description of the activity studied" (Woolsey, 1986, p. 248). All coding was completed manually.

Using Smith's (1995) guidelines for a qualitative thematic analysis, the data were read twice: first to gain a holistic perspective, and second to note emerging themes. Inductive analysis allows the themes and subthemes to naturally emerge from the data (Strauss & Corbin, 1990) and is an iterative process for conceptualizing data that

considers assessments of similarity and difference (Bulmer, 1979). To be considered a theme, coding followed Owen's (1984) method of interpretation to ensure each theme met the following criteria: recurrence—different words could express the same idea or meaning, repetition—key words, sentences, or phrases were repeated to indicate the same thread of meaning, and forcefulness—underlining words or phrases or increasing the size of the font.

A cross-sectional code and retrieve method (Mason, 2002; Spencer, Ritchie, & O'Connor, 2007) was utilized for analysis, which involved creating codes from an initial reading of the data and applying these codes across the full sample. For example, the first memorable message comprised of an initial category or theme. For each subsequent message, it was compared to the existing categories. If a unit was similar to an existing category, it was grouped with it; if a unit was different from all existing categories, a new category was created. This process continued until reaching saturation (Glaser & Strauss, 1967; Strauss & Corbin, 1990) and all messages were coded into themes.

Next, a description of the three primary themes found for Research Question 1 are presented, see Table 3. Memorable messages are provided as exemplars of each theme are presented verbatim. Each excerpt also includes the following demographic information about the participant who shared the memorable message is provided: sex (Male or Female), classification (Freshman, Sophomore, Junior, or Senior), Greek affiliation (Non-Greek or Greek), prior use status (Prior User or Never User), and veteran status (Veteran).

Academics.

Participants frequently reported memorable messages that were related to academics or academic achievement. The memorable messages in this category focused on MPS as a potential “tool” for studying by enhancing alertness in the user and aiding in concentration. Most often, participants’ memorable messages involved notions that prescription stimulants are a useful study aid (“Adderall is the best! It makes you so productive, if you try it you'll get EVERYTHING you need done.” – Female, Junior, Non-Greek, Prior User). Other examples of memorable messages participants reported include, "I have used it while studying for finals. It once let me stay up for eight hours. I can get it from a friend who has been prescribed" (Male, Freshman, Non-Greek, Prior User) and “Adderall is a pill that makes you smarter” (Female, Junior, Greek, Prior User). Participants also reported memorable messages that suggested MPS aids in alertness or concentration (“Adderall will help you concentrate while studying” – Female Senior, Greek, Prior User) and "Adderall gives you extreme focus, you should try it when you study for your next test" (Female, Freshman, Non-Greek, Never User).

Memorable messages in this theme also highlighted that other students engage in MPS, suggesting a normative belief shared among college students that focuses on the social perceptions or norms of other students engaging in MPS for academic reasons. For example a female (Junior, Non-Greek, Never User) reported her memorable message as “My cousin went to college and when he got there he said everyone was using ADD/ADHD medicine in order to study so he needed it as well to do as well as them.” Another student reported someone saying, “It gives you an advantage. If everyone else is

doing it, you would be putting yourself at a disadvantage to not do the same" (Male, Junior, Greek, Never User).

For some students, the memorable message contained information about drug seeking or providing. For example, a female (Junior, Non-Greek, Never User) reported her memorable message as a friend telling her, "I give them to friends who may need them but can't get a hold of them." Other students reported that they had a conversation in which the conversation partner reported looking for drugs, and this was the message that stuck with them. Finally, one participant reported on a memorable message that focused on academic integrity and dishonesty. The memorable message she received was as follows; "You are committing academic dishonestly if you take prescription stimulants that were not prescribed to you" (Female, Junior, Greek, Never User).

Health outcomes.

Participants reported memorable messages that focused on the health outcomes of engaging in MPS. This theme encompassed messages that highlight the health risk associated with engaging in MPS. The most common subtheme focused on the symptoms or side effects of taking prescription stimulants without a prescription. For example, a female (Junior, Greek, Prior User) stated being told, "If it's not prescribed it can have effects similar to cocaine." Another student reported their memorable message as, "It can cause seizures" (Female, Junior, Greek, Never User).

Some memorable messages that highlighted the side effects of use that seemed to not be grounded in medical facts, for example, a female reported her memorable message as "If you take drugs such as Adderall, don't eat and drink coffee you could have a heart

attack" (Senior, Greek, Prior User). Another female student reported a memorable message that focused on psychological rather than physical side effects, she was told, "Adderall will change your mood and behaviors" (Senior, Non-Greek, Never User). Finally, a male user described a memorable message that focused on perhaps a little known medical fact about MPS, "Erectile Dysfunction comes from Adderall usage" (Junior, Non-Greek, Never User).

In addition, some participants reported memorable messages that highlighted a side effect that extant research has found to be a motivation for MPS: weight loss. A freshman female stated her memorable message as, "I lost a bunch of weight when I was on Adderall because it always kept me wanting to work and had me forgetting about meals" (Greek, Never User). Additionally, another participant reported, "Adderall makes you lose your appetite, so if you want to lose weight, just take Adderall" (Female, Sophomore, Non-Greek, Prior User). Further, a few students reported memorable messages that highlighted the risk of becoming dependent on the stimulant. One reported the memorable message they received as, "Do not use prescription stimulants if you are not prescribed to them because you do not want to become dependent on them" (Female, Freshman, Non-Greek, Never User), while another participant was told, "ADD/ADHD medication can be addictive and lead to necessary use to perform academically" (Female, Sophomore, Greek, Prior User).

Some students also reported memorable messages that focused on the potential damage to organs that may come with MPS use. One student received the message, "Do not use this medication if its was [*sic*] not prescribed by your doctor as it could result in

serious health issues or brain damage" (Female, Junior, Non-Greek, Never User). One participant simply stated their memorable message as, "It isn't good for your brain" (Female, Junior, Greek, Prior User).

Finally, some participants' memorable messages focused on the unknown risk factors of MPS. For example, one participant reported their memorable message as, "Do not use medicine that is not in your name. You don't know how your body will react to it" (Female, Junior, Non-Greek, Never User). Another participant, who had engaged in prior use of MPS was told, "It is very dangerous to use prescription stimulants illegally because your Doctor has screened your body to know if it is okay to use" (Female, Sophomore, Non-Greek). Another reported a memorable message that focused on misusing prescriptions more broadly: "Using prescriptions that aren't yours is dangerous no matter what the drug is but using someone else's prescription stimulants can be damaging to your brain and have unpredictable side effects because everyone reacts differently to different drugs" (Female, Freshman, Non-Greek, Prior User).

Responsible use.

The final supra theme of memorable messages focused on responsible use. These messages tended to make recommendations of responsible use for individuals, as well as focus on the illegal nature of MPS. For example, one user's memorable message simply stated: "Don't use prescriptions that are not prescribed to you" (Female, Sophomore, Non-Greek, Prior User). Another was told, "If you're not prescribed the drug, you're not meant to take it" (Male, Sophomore, Veteran, Greek, Prior User). Regarding legality, one participant reported her memorable message as, "It is 100% illegal to take ADHD

medicine when it is not prescribed to you" (Female, Senior, Greek, Never User). Another participant's memorable message focused on the process that prescription holder has to go through to obtain stimulants and use them responsibly, "People who actually have ADD have to go through a long process every three months in order to refill their prescription. This is to assure that they are using the medicine for themselves and not selling it or letting another person (who doesn't have ADD) use their medicine" (Female, Junior, Non-Greek, Prior User). Additionally, one participant reported a memorable message that focused on doctors, she was told, "Doctors give out ADD/ADHD medicine too much" (Female, Junior, Greek, Never User).

In addition, some messages focused on the potential danger of MPS. One participant received the message, "Using non-medical prescriptions is dangerous and unfair" (Female, Junior, Non-Greek, Prior User). Other messages focused on the misuse of prescription stimulants, one participant reported, "Kids take Adderall like candy these days" (Female, Senior, Greek, Prior User).

A small percentage of participants reported on memorable messages that focused on media. A few participants' reported the memorable messages were related to plot lines in TV shows. For example, one participant stated, "Specifically, I watched *Law and Order SVU*, and there was an episode about a girl who took prescription drugs to stay awake and enhance her academic performance. She ended up killing her roommate and being sentenced to prison, so I didn't want that to be me" (Female, Junior, Veteran, Greek, Never User). Included in this theme are messages that focus on health education campaigns. For example, one participant was told, "I study natural" (Female, Senior,

Non-Greek, Prior User), which refers to a Health Education Campaign about MPS designed by the University.

Based on these themes, a categorical variable was created for the purposes of quantitatively analyzing Research Questions 4, 7, and 8. Each participant's memorable message was coded into only one of the three main themes—the theme that was more pronounced or prominent in the message.

Table 3. Frequency of Memorable Message Themes

Memorable Message Themes	**No. of appearances**	**% of total**
Academics	44	34.1%
Health Outcomes	49	38.0%
Responsible Use	36	27.9%
Total	129	

Next, Chapter Five provides the descriptions of the preliminary analyses to the quantitative component of this dissertation. Then, a description of the statistical tests and the results of the analyses for the primary and follow-up studies are presented.

Chapter Five: Quantitative Results

The purpose of this research was to examine how memorable messages regarding illicit stimulants are associated with one's intention to use stimulants. Several analyses were conducted to test the pathways from variables associated with message features, attitudes, norms, and efficacy to behavioral intention. These analyses are described in the preliminary analyses section to provide context within which young adults' conversations with friends about prescription stimulants can be interpreted. Next, a description of the preliminary analyses is presented followed by a description of the quantitative analyses used to assess Hypotheses 1 and 2 and Research Questions 2-11.

PRELIMINARY ANALYSES

The initial data analysis steps involved compiling responses to the open ended items (described in Chapter Four), cleaning the data file, identifying missing data, calculating descriptive statistics and scale reliabilities, and completing confirmatory factor analyses for the variables used in the path analysis.

Missing Data.

To ensure the integrity of the data, the first preliminary analysis sought to determine if missing data were minimal and missing completely at random (MCAR; see Little, 1988). Little's MCAR test was not significant for the primary study, χ^2 (1766) = 1809.23, p = .23. Additionally, Little's MCAR test was not significant for the follow-up study, χ^2 (6) = 5.95, p = .43, suggesting that data were minimal and missing at random. To utilize all available data, expectation maximization (EM; Dempster, Laird, & Rubin, 1977) was used. EM is a maximum likelihood procedure in which the parameters are

estimated, then missing values are estimated (Howell, 2008). Additionally, EM infers values based on the likelihood under the normal distribution (Hill, 1997) and is advantageous as it produces nearly unbiased estimates of means, variances, and co-variances (Howell, 2008).

Normality.

Next, all variables were examined for normality, and statistics for skewness and kurtosis and graphs of data indicated that the main variables were normally distributed. Descriptive statistics, including means, standard deviations, Pearson product-moment correlations for all variables included in the primary study are reported in Table 4, and for the follow up study in Table 5.

Table 4. Bivariate correlations among primary study variables.

Variable		*M*	*SD*	1	2	3	4	5	6	7	8
1	Attitudes	2.96	1.47	1	.38***	.33***	.67***	.21*	.06	.31***	.24**
2	Norms	2.69	1.40		1	.12	.52***	.27**	.22**	.23**	.22**
3	Efficacy	5.60	.92			1	.37***	.25**	.12	.14	05
4	Behavioral Intention	3.32	1.99				1	.25**	.01	.22**	.23**
5	Closeness	4.49	2.02					1	.63***	.13	.01
6	Similiarity	4.37	1.39						1	.05	-.11
7	Sensation Seeking	4.46	1.24							1	.33***
8	Internal Restlessness	4.23	1.06								1

Note. $N = 137$, * $p \leq .05$,** $p \leq .01$, *** $p \leq .001$

Table 5. Bivariate correlations among follow-up study variables.

Variable		*M*	*SD*	1	2	3	4	5	6
1	Attitudes	3.08	1.50	1	.52***	.31**	.73***	.49***	.32**
2	Norms	2.53	1.35		1	.29**	.55***	.35**	.25*
3	Efficacy	5.45	.83			1	.34**	.29**	.08
4	Behavioral Intention	3.20	1.97				1	.41***	.30**
5	Sensation Seeking	4.16	1.37					1	.36**
6	Internal Restlessness	4.17	1.03						1

Note. $N = 89$, * $p \leq .05$,** $p \leq .01$, *** $p \leq .001$

Assessing potential control variables for the primary study.

The next group of preliminary analyses was performed to determine the equivalency of the two data collection groups: the Communication Studies participant pool and the Advertising participant pool. A series of chi-square tests of independence revealed no significant differences between the two collection groups in terms of the demographic variables of gender, χ^2 (1, n = 137) = 3.10, p = .08, ethnicity, χ^2 (1, n = 137) = 7.77, p = .35, student veteran status, χ^2 (1, n = 134) = .44, p = .51, major, χ^2 (1, n = 137) = 8.10, p = .23, Greek status, χ^2 (1, n = 137) = 2.80, p = .10, residence, χ^2 (1, n = 137) = 6.25, p = .18, current prescription status, χ^2 (1, n = 137) = 1.49, p = .22, or prior use status, χ^2 (1, n = 137) = .06, p = .81. Finally, an independent samples t-test revealed no significant differences between the two sample groups in terms of age, t(125) = -.58, p = .56.

Next, independent samples t-tests were conducted to determine if there were any differences on the TPB variables of interest in regard to the data collection groups. The attitudes of students in the Advertising and Public Relations participant pool (M = 2.97, SD = 1.42) and those students in the Communication Studies participant pool (M = 2.95, SD = 1.54) were not significantly different, t(135) = .10, p = .92. The normative beliefs of students in the Advertising and Public Relations participant pool (M = 2.46, SD = 1.37) and those students in the Communication Studies participant pool (M = 2.90, SD = 1.41) were not significantly different, t(135) = -1.85, p = .07. The efficacy beliefs of students in the Advertising and Public Relations participant pool (M = 5.77, SD = .82) and those students in the Communication Studies participant pool (M = 5.44, SD = .99) were

significantly different, $t(135) = 2.14$, $p < .05$. Finally, there were no significant differences in behavioral intention, $t(135) = -.73$, $p = .47$, between participants from the Advertising and Public Relations participant pool ($M = 3.20$, $SD = 1.94$) and those in the Communication Studies participant pool ($M = 3.44$, $SD = 2.05$). Because, sample group differed significantly on efficacy, it was included as a control variable in the path model for the primary study, see Table 6.

Additionally, independent samples *t*-tests were conducted to explore if there were differences on the TPB variables of interest regarding gender. There were significant differences on attitudes between males and females, $t(135) = 2.28$, $p < .05$, indicating that males had more favorable attitudes about MPS ($M = 3.56$, $SD = 1.45$) than females ($M = 2.83$, $SD = 1.45$). There were no significant differences in normative belief between men ($M = 3.07$, $SD = 1.73$) and women ($M = 2.61$, $SD = 1.31$), $t(135) = 1.51$, $p = .13$. Additionally, there were no significant differences in efficacy beliefs between men ($M = 5.41$, $SD = 1.31$) and women ($M = 5.64$, $SD = .81$), $t(135) = -1.10$, $p = .27$. Finally, there were no significant differences in behavioral intention between males ($M = 3.33$, $SD = 2.10$) and females ($M = 3.32$, $SD = 1.99$), $t(135) = .03$, $p = .97$. Because of the significant differences on the variable of attitude, gender was included as a control variable for the primary study, see Table 7.

Table 6. Results of *t*-tests and Descriptive Statistics for TPB Variables by Data Collection Group

TBP Variable	Group						95% CI for Mean Difference		
	Advertising & Public Relations			Communication Studies					
	M	*SD*	*n*	*M*	*SD*	*n*		*t*	*df*
Attitude	2.97	1.42	66	2.95	1.54	71	-.48, .52	0.10	135
Norms	2.46	1.37	66	2.90	1.41	71	-.91, .03	-1.85	135
Efficacy	5.77	.82	66	5.44	.99	71	.03, .64	2.14*	135
Intention	3.20	1.94	66	3.44	2.05	71	-.92, .43	-0.73	135

Note. * $p < .05$.

Table 7. Results of *t*-tests and Descriptive Statistics for TPB Variables by Gender

TBP Variable	Group						95% CI for Mean Difference		
	Males			Females					
	M	*SD*	*n*	*M*	*SD*	*n*		*t*	*df*
Attitude	3.56	1.45	25	2.83	1.45	112	.10, 1.37	2.28*	135
Norms	3.07	1.73	25	2.61	1.31	112	-.15, 1.08	1.51	135
Efficacy	5.41	1.31	25	5.64	0.81	112	-.63, .18	-1.10	135
Intention	3.33	2.10	25	3.32	1.99	112	-.86, .89	0.03	135

Note. * $p < .05$.

Research has demonstrated that MPS is more likely to occur among students with an association to a Greek organization (Rabiner et al., 2010, SAMHSA, 2009), self-reported attention problems (Rabiner et al. 2010; SAMHSA, 2009), and higher degrees of sensation seeking (Checton & Greene, 2010). Therefore these characteristics were assessed as potential control variables in the path analysis for the primary study.

Independent samples *t*-tests revealed significant differences between affiliation with a Greek organization on the variable of attitudes about MPS, $t(135) = -3.59$, $p < .001$, such that those with a Greek affiliation had more favorable attitudes ($M = 3.56$, $SD = 1.36$) compared to those not affiliated with a Greek organization ($M = 2.65$, $SD = 1.44$). Additionally, those affiliated with a Greek organization had stronger normative beliefs that others were engaging in MPS ($M = 3.42$, $SD = 1.18$) compared to those not affiliated with a Greek organization ($M = 2.31$, $SD = 1.37$), $t(135) = -4.71$, $p < .001$. Participants affiliated with a Greek organization also had stronger efficacy beliefs ($M = 5.89$, $SD = .71$) than those not affiliated with a Greek organization ($M = 5.44$, $SD = .98$), $t(135) = -2.78$, $p < .01$. Finally, those involved with a Greek organization had stronger behavioral intentions to engage in MPS ($M = 4.03$, $SD = 1.86$) than those individuals not involved in a Greek organization ($M = 2.95$, $SD = 1.97$), $t(135) = -3.10$, $p < .01$. Thus, Greek association was included as a control variable for the primary study, see Table 8.

Because the memorable messages undergraduates recall may differ between those students who have used stimulants before and thus have higher expectations, compared to those who have not used stimulants before and have formed normative beliefs, prior use status was examined as a control variable. Independent samples *t*-test revealed significant

differences on attitudes, $t(135) = -3.47$, $p = .001$, such that those participants who had previously used prescription stimulants reported more favorable attitudes ($M = 3.36$, $SD = 1.49$) compared to those who had not previously engaged in MPS ($M = 2.52$, $SD = 1.34$). There was no significant differences between those who had previously engaged in MPS ($M = 2.81$, $SD = 1.39$) and those who had not ($M = 2.56$, $SD = 1.41$) with regard to normative beliefs, $t(135) = -1.04$, $p = .30$. Individuals who engaged in MPS previously had higher efficacy beliefs ($M = 5.86$, $SD = .82$) compared to those who had not engaged in MPS previously ($M = 5.30$, $SD = .95$), $t(135) = -3.68$, $p < .001$. Finally, those who had previously used prescription stimulants had stronger behavioral intentions ($M = 4.11$, $SD = 1.94$) than those who had not used prescription stimulants ($M = 2.45$, $SD = 1.68$), $t(135) = -5.32$, $p < .001$. Thus, prior use status was included in the final path model as a control; see Table 9.

Table 8. Results of *t*-tests and Descriptive Statistics for TPB Variables by Greek Affiliation

TBP Variable	Group						95% CI for Mean Difference		
	Greek			Non-Greek					
	M	SD	n	M	SD	n		t	df
Attitude	3.56	1.36	47	2.65	1.44	90	-1.42, -.41	-.359***	135
Norms	3.42	1.18	47	2.31	1.37	90	-1.57, -.64	-4.71***	135
Efficacy	5.89	.71	47	5.44	.98	90	-.77, -.13	-2.78**	135
Intention	4.03	1.86	47	2.95	1.97	90	-1.76, -.39	-3.10**	135

Note. * $p \leq .05$,** $p \leq .01$, *** $p \leq .001$

Table 9. Results of *t*-tests and Descriptive Statistics for TPB Variables by Prior Use Status

TBP Variable	Group						95% CI for Mean Difference		
	Prior Use			Never User					
	M	SD	n	M	SD	n		t	df
Attitude	3.36	1.49	72	2.52	1.34	65	-1.32, -.36	-3.47***	135
Norms	2.81	1.39	72	2.56	1.41	65	-.73, .22	-1.04	135
Efficacy	5.86	.82	72	5.30	.95	65	-.85, -.26	-3.68***	135
Intention	4.11	1.94	72	2.45	1.68	65	-2.27, -1.04	-5.32***	135

Note. * $p \leq .05$,** $p \leq .01$, *** $p \leq .001$

Next, the possible control variables of sensation seeking and internal restlessness (i.e., self-reported attention problems) were examined using correlations with the TPB variables. Sensation seeking was significantly and positively associated with attitudes, $r(135) = .31$, $p < .001$, norms, $r(135) = .23$, $p < .01$, and intention, $r(135) = .22$, $p < .01$. Internal restlessness was significantly and positively associated with attitudes, $r(135) = .24$, $p < .01$, norms, $r(135) = .22$, $p = .01$, and intention, $r(135) = .23$, $p < .01$. Efficacy was not significantly associated with either sensation seeking, $r(135) = .14$, $p = .10$, or internal restlessness, $r(135) = .05$, $p = .60$. However, because sensation seeking and internal restlessness were significantly associated with the other TPB variables, both were included as controls in the path model (see Table 4).

Assessing potential control variables for the follow-up study.

The same control variables assessed for the primary study were assessed for the follow-up data set. First, independent samples *t*-tests were conducted to determine if there were any differences on the TPB variables of interest in regard to the data collection group. The attitudes of students in the Advertising and Public Relations participant pool ($M = 3.27$, $SD = 1.56$) and those students in the Communication Studies participant pool ($M = 2.86$, $SD = 1.42$) were not significantly different, $t(87) = -1.27$, $p = .21$. The normative beliefs of students in the Advertising and Public Relations participant pool ($M = 2.55$, $SD = 1.36$) and those students in the Communication Studies participant pool ($M = 2.52$, $SD = 1.36$) were not significantly different, $t(87) = -.12$, $p = .90$. Additionally, the efficacy beliefs of students in the Advertising and Public Relations participant pool ($M = 5.43$, $SD = .87$) and those students in the Communication Studies participant pool ($M =$

5.48, *SD* = .79) were not significantly different, $t(87) = .26$, $p = .80$. Finally, there were no significant differences in behavioral intention, $t(87) = .02$, $p = .99$, between participants from the Advertising and Public Relations participant pool ($M = 3.20$, $SD = 1.97$) and those in the Communication Studies participant pool ($M = 3.21$, $SD = 1.99$), see Table 10. Next, a chi-square test of independence was performed to examine the relationship between behavioral use at Time 2 and sample group. The relationship between these variables was not significant, χ^2 (1, $n = 89$) = 2.98, $p = .08$. Therefore, group was not included in the path model for the follow-up study as a control variable.

Next, independent samples *t*-tests were used to determine if there were differences on the TPB variables of interest and participant sex. The attitudes of males ($M = 3.25$, $SD = 1.46$) and females ($M = 3.01$, $SD = 1.54$) were not significantly different, $t(86) = .66$, $p = .51$. The normative beliefs between males ($M = 2.79$, $SD = 1.49$) and females ($M = 2.42$, $SD = 1.30$) were not significantly different, $t(86) = 1.15$, $p = .25$. The efficacy beliefs between males ($M = 5.40$ $SD = .79$) and females ($M = 5.52$, $SD = .76$) were not significantly different, $t(86) = -.68$, $p = .50$. Additionally, behavioral intention was not significantly different, $t(86) = -1.29$, $p = .30$, for males ($M = 2.74$, $SD = 1.77$) and females ($M = 3.35$, $SD = 2.03$), see Table 11. Next, a chi-square test of independence was performed to examine the relationship between behavioral use at Time 2 and participant sex. The relationship between these variables was not significant, χ^2 (1, $n = 88$) = .002, $p = .96$. Therefore, sex was not included in the path model for the follow-up study as a control variable.

Table 10. Results of *t*-tests and Descriptive Statistics for TPB Variables by Data Collection Group for Follow-Up Study

TBP Variable	Group						95% CI for Mean Difference		
	Advertising & Public Relations			Communication Studies					
	M	*SD*	*n*	*M*	*SD*	*n*		*t*	*df*
Attitude	3.27	1.56	49	2.86	1.42	40	-1.04, .23	-1.27	87
Norms	2.55	1.36	49	2.52	1.36	40	-.61, .54	-0.12	87
Efficacy	5.43	0.87	49	5.48	0.79	40	-.31, .40	0.26	87
Intention	3.20	1.97	49	3.21	1.99	40	-.83, .85	0.02	87

Note. * $p < .05$.

Table 11. Results of *t*-tests and Descriptive Statistics for TPB Variables by Gender for Follow-Up Study

TBP Variable	Group						95% CI for Mean Difference		
	Males			Females					
	M	*SD*	*n*	*M*	*SD*	*n*		*t*	*df*
Attitude	3.25	1.46	24	3.01	1.54	64	-.48, .96	0.66	86
Norms	2.79	1.49	24	2.42	1.30	64	-.27, 1.02	1.15	86
Efficacy	5.40	0.79	24	5.52	0.76	64	-.49, .24	0.68	86
Intention	2.74	1.77	24	3.35	2.03	64	-1.54, .33	-1.29	86

Note. * $p < .05$.

Independent samples *t*-tests revealed significant differences in attitudes about MPS between those participants affiliated with a Greek organization (M = 4.05, SD = 1.00) and those not affiliated with a Greek organization (M = 2.82, SD = 1.51), $t(87) = -3.35$, $p = .001$. Additionally, participants associated with a Greek organization had stronger normative beliefs that others were engaging in MPS (M = 3.48, SD = 1.11) compared to those not affiliated with a Greek organization (M = 2.27, SD = 1.30), $t(87) = -3.69$, $p < .001$. There were no significant differences between Greek affiliates (M = 5.72, SD = .54) and non-Greek participants (M = 5.38, SD = .88) for efficacy, $t(87) = -1.59$, $p = .12$. Participants without a Greek affiliation had weaker behavioral intentions (M = 2.90, SD = 1.86) compared to those participants with a Greek affiliation (M = 4.32, SD = 2.01), $t(87) = -2.89$, $p < .01$, see Table 12. Finally, a chi-square test of independence was performed to examine the relationship between behavioral use at Time 2 and Greek affiliation. The relationship between these variables was not significant, χ^2 (1, n = 89) = .01, $p = .75$. Because of the significant associations between Greek affiliation and the TPB variables, it was included as a control variable in the path analysis for the follow-up study.

The variable of prior use status was investigated next. Independent samples *t*-tests revealed significant differences on attitudes, $t(87) = -5.27$, $p < .001$, between participants who had *not* previously used prescription stimulants (M = 2.30, SD = 1.22) and those participants who had previously used prescription stimulants (M = 3.79, SD = 1.40). Additionally, participants who had *not* previously used prescription stimulants had lower normative beliefs about MPS (M = 2.09, SD = 1.26) compared to those who had

previously used stimulants (M = 2.93, SD = 1.33), $t(87) = -3.07$, $p < .01$. Participants who had *not* used stimulants previously had lower efficacy beliefs (M = 5.13, SD = .71) than those participants who had previously used stimulants (M = 5.74, SD = .83), $t(87) = -3.68$, $p < .001$. Further, participants who had *not* previously used stimulants had lower behavioral intentions (M = 2.20, SD = 1.43) than those participants who had used stimulants in the past (M = 4.10, SD = 1.96), $t(87) = -5.16$, $p < .001$, see Table 13. Finally, a chi-square test of independence was conducted to examine the association between prior use status and behavioral use. The relationship between these variables was significant, χ^2 (1, n = 89) = 11.52, p = .001, with a moderate association between prior use and behavioral use, Φ = .36, p = .001, CI: .000, .001 (see Rea & Parker, 1992). Therefore, prior use status was included in the path model for the follow-up study as a control variable.

Table 12. Results of *t*-tests and Descriptive Statistics for TPB Variables by Greek Affiliation for Follow-Up Study

TBP Variable	Group						95% CI for Mean Difference		
	Greek			Non-Greek					
	M	*SD*	*n*	*M*	*SD*	*n*		*t*	*df*
Attitude	4.05	1.00	19	2.82	1.51	70	-1.96, -.501	-3.35***	87
Norms	3.48	1.11	19	2.27	1.30	70	-1.86, -.56	-3.69***	87
Efficacy	5.72	0.54	19	5.38	0.88	70	-.76, .09	-1.59	87
Intention	4.32	2.01	19	2.90	1.86	70	-2.39, -.44	-2.89**	87

Note. * $p \leq .05$,** $p \leq .01$, *** $p \leq .001$

Table 13. Results of *t*-tests and Descriptive Statistics for TPB Variables by Prior Use Status for Follow-Up Study

TBP Variable	Group						95% CI for Mean Difference		
	Prior Use			Never User					
	M	*SD*	*n*	*M*	*SD*	*n*		*t*	*df*
Attitude	3.79	1.40	47	2.30	1.22	42	-2.03, -.92	-5.27***	87
Norms	2.93	1.33	47	2.09	1.26	42	-1.39, -.30	-3.07**	87
Efficacy	5.74	.83	47	5.13	0.71	42	-.93, -.28	-3.68***	87
Intention	4.10	1.96	47	2.20	1.43	42	-2.63, -1.17	-5.16***	87

Note. * $p \leq .05$,** $p \leq .01$, *** $p \leq .001$

Next, correlations were used to determine the relationships between the variables of sensation seeking and internal restlessness with the TPB variables of interest. Correlations revealed that the variable of sensation seeking was significantly related to attitudes, $r(87) = .49$, $p < .001$, norms, $r(87) = .35$, $p = .001$, efficacy, $r(87) = .29$, $p < .01$, intention, $r(87) = .41$, $p < .001$. Additionally, internal restlessness was significantly associated with the variables of attitude, $r(87) = .32$, $p < .01$, norms, $r(87) = .25$, $p < .05$, and intention, $r(87) = .30$, $p < .01$. However efficacy was not significantly associated with internal restlessness, $r(87) = .08$, $p = .46$, (see Table 5).

Finally, a series of independent samples *t*-test were conducted to examine the association between behavioral use at Time 2 and sensation seeking and internal restlessness, respectively. Those who had *not* engaged in MPS at Time 2 had lower sensation seeking behaviors ($M = 3.98$, $SD = 1.44$) compared to those who had engaged in MPS at Time 2 ($M = 4.61$, $SD = 1.10$), and the difference was approaching significance, $t(87) = -1.98$, $p = .051$. Thus, because of the significant correlations with the TPB variables, sensation seeking was included in the path model as a control. There were no significant differences between those who had engaged in MPS at Time 2 ($M = 4.47$, $SD = .93$) and those who had *not* engaged in MPS at Time 2 ($M = 4.05$, $SD = 1.05$) regarding internal restlessness, $t(87) = -1.77$, $p = .08$, see Table 14. However, because of the significant correlations with the TPB variables described above, internal restlessness was included as a control variable in the path analysis for the follow-up study.

Table 14. Results of *t*-tests and Descriptive Statistics for Sensation Seeking and Internal Restlessness by Behavioral Use

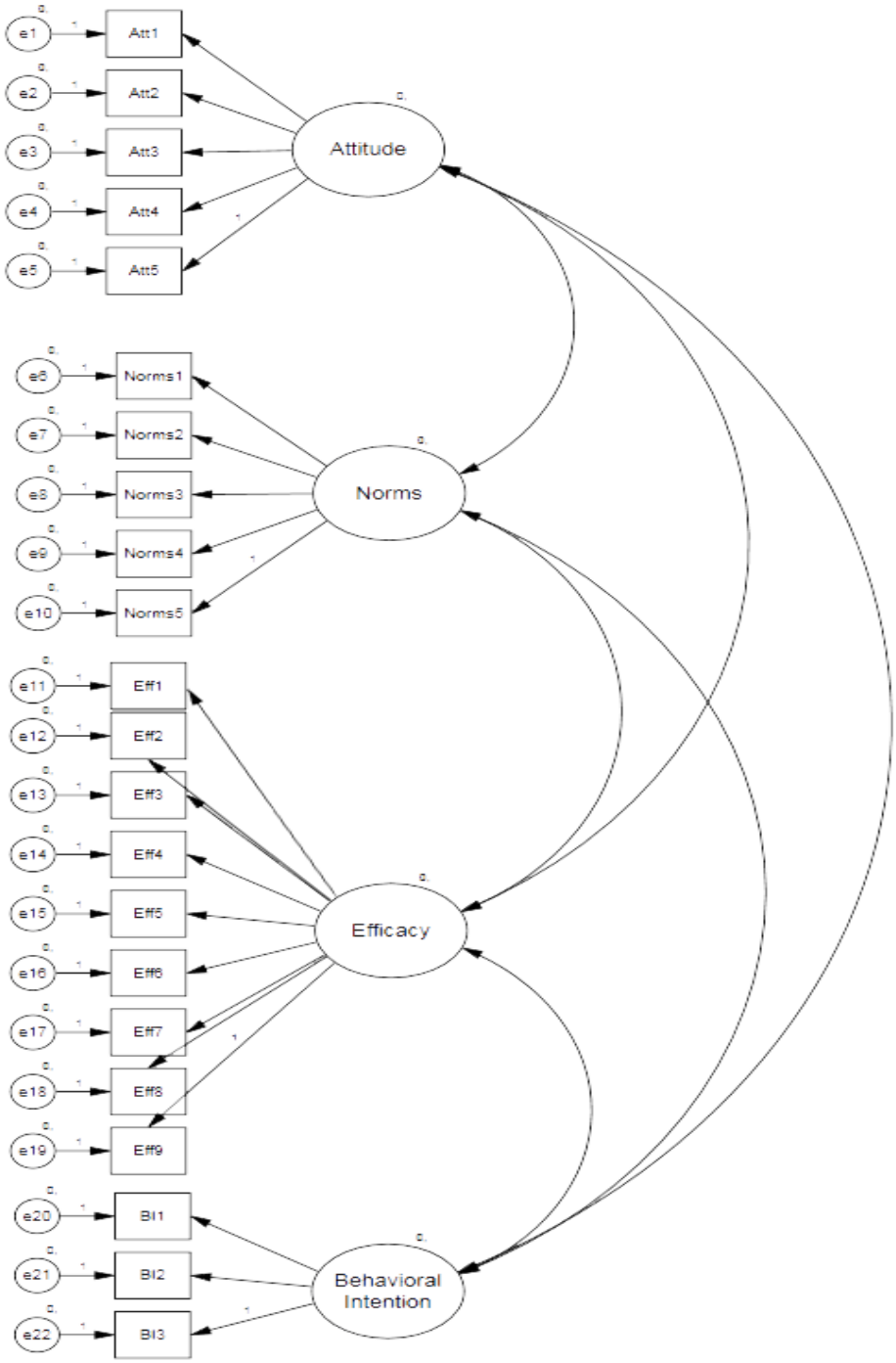
Variable	Group						95% CI for Mean Difference	*t*	*df*
	Use at T2			No Use at T2					
	M	*SD*	*n*	*M*	*SD*	*n*			
Sensation Seeking	4.61	1.10	26	3.98	1.44	63	-1.25, .002	-1.98[m]	87
Internal Restlessness	4.47	.93	26	4.05	1.05	63	-.89, .05	-1.77	87

Note. [m]$p < .10$

Confirmatory factor analyses.

Because items were adapted from Ajzen (2002) for this study, confirmatory factor analysis (CFA) was used to examine the relationships among the observed individual scale items and the corresponding latent factors (Jackson, Gillaspy, Purc-Stephenson, 2009) of the TPB variables. Though the individual scales showed adequate to high reliability coefficients, CFA is useful for refining scales and plays an important role in measurement model validation in path analysis (Brown, 2006; MacCallum & Austin, 2000). Using AMOS, the CFA was created which included the four latent factors of attitudes, norms, efficacy, and behavioral intention. The latent factor of attitude had five items, norms had five items, efficacy had nine items, and behavioral intention had three items (see Figure 2).

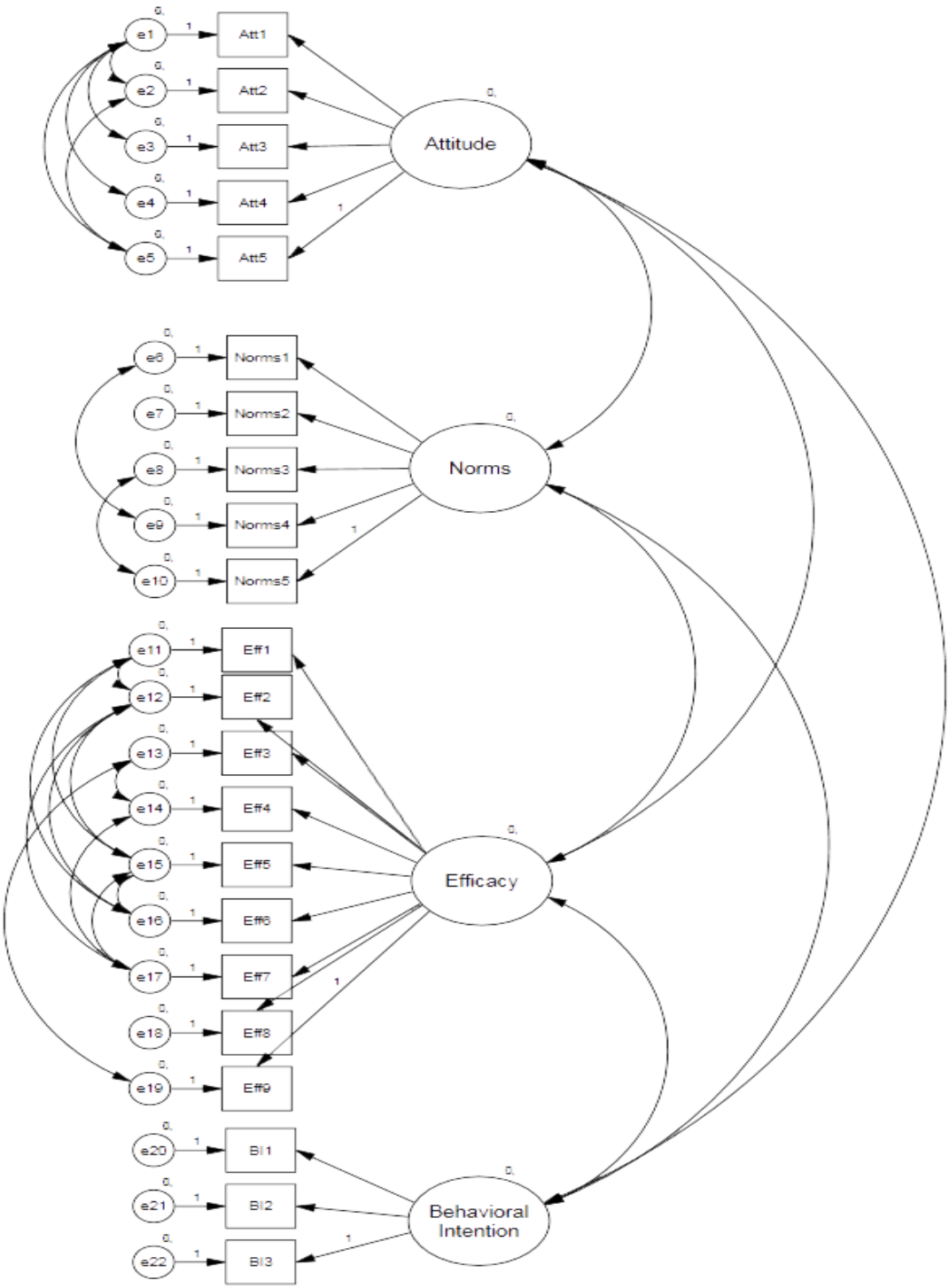
Figure 2: Confirmatory Factor Analysis for TPB Variables



Plan of analysis for the CFA. Model fit of the hypothesized path models were evaluated using five common fit indices: (a) the maximum likelihood chi-square statistic, (b) comparative fit index (CFI; Bentler, 1990), (c) Tucker-Lewis index (TLI; Tucker & Lewis, 1973), (d) root mean square error of approximation (RMSEA; Steiger & Lind, 1980), and (e) standardized root mean square residual (SRMR; Bentler, 1995), following the recommendations of good fit by Bagozzi and Youjae (1988) and Hu and Bentler (1999). In examining model fit the fit indices should be as follows to indicate acceptable model fit: the model's chi-square should not be significant; the model's CFI and TLI should be greater than 0.90; and the SRMR and the RMSEA should be less than 0.08 (Keith, 2006; Kline, 2011). If the full model proposed did not have sufficient fit, the model was modified based on theory and modification indices.

The CFA model did not fit the data well: χ^2 (203) = 693.72, $p < .001$, CFI = .76, TLI = .73, RMSEA = .13, and SRMR = .20. Following the recommendations of the modification indices to covary the error terms on each respective factors, the model fit was improved and fit the data marginally: χ^2 (185) = 365.36, $p < .001$, CFI = .91, TLI = .89, RMSEA = .09, and SRMR = .17 (see Figure 3). As the revised model was nested within the initial model, Wald's test, a chi-square difference test, was used to compare the two models. The result was significant, $\Delta\chi 2 = 328.36$, $\Delta df = 18$, $p < .001$, indicating that covarying the error terms improved the model fit.

Figure 3: Final Confirmatory Factor Analysis Model for the TPB Variables



Because CFA is a large sample procedure, with a common minimum sample of 200 (Kenny, 2014), or 10 per path (Kline, 2011), it is not surprising model fit was not strong. As such, a CFA for each individual latent factor was run next.

The CFA for attitudes revealed adequate model fit, χ^2 (5) = 45.27, p < .001, CFI = .92, TLI = .84, RMSEA = .24, and SRMR = .05. Following the recommendations of the modification indices to improve model fit, error terms were covaried, resulting in improved model fit, χ^2 (1) = .02, p = .90, CFI = 1.00, TLI = 1.02, RMSEA = .00, and SRMR = .00. The result was significant, $\Delta\chi2$ = 45.25, Δdf = 4, p < .001.

The CFA for norms revealed adequate model fit, χ^2 (5) = 14.97, p = .01, CFI = .97, TLI = .94, RMSEA = .12, and SRMR = .03. Following the recommendations of the modification indices to improve model fit, error terms were covaried, resulting in improved model fit, χ^2 (3) = .80, p = .85, CFI = 1.00, TLI = 1.02, RMSEA = .00, and SRMR = .01, $\Delta\chi2$ = 14.17, Δdf = 2, p < .001.

The CFA for efficacy revealed poor model fit, χ^2 (27) = 412.56, p < .001, CFI = .36, TLI = .15, RMSEA = .32, and SRMR = .26. Following the recommendations of the modification indices to improve model fit, error terms were covaried, resulting in improved model fit, χ^2 (10) = 4.94, p = .90, CFI = 1.00, TLI = 1.03, RMSEA = .00, and SRMR = .03, $\Delta\chi2$ = 407.62, Δdf = 17, p < .001. An inspection of path estimates revealed a few non-significant paths, but based upon the reliability analysis, removing the paths would not improve reliability; thus, all items were retained. Because of the good reliability coefficients, and the adequate model fit from the CFAs after modifications, it

was determine that the items indeed measured their respective factors, and further analysis could continue.

After the completion of all preliminary data analysis procedures, the main quantitative analyses were conducted to assess Hypotheses 1 and 2 and Research Questions 2-11 are described next.

MAIN ANALYSES: QUANTITATIVE ANALYSIS

Valence and Sources of Memorable Messages

Research Question 2 asked about the valence of the memorable message about MPS. The valence of the memorable messages were more negative than neutral (M = 1.74, SD = .78), with the majority of participants reporting the tone of the memorable message was negative (n = 63, 46%), followed by neutral (n = 46, 33.6%), and positive (n = 28, 20.4%).

Research Question 3 asked about the sources of memorable messages about MPS. Overall, participants reported messages came from a friend (n = 38, 27.7%), a classmate (n = 14, 10.2%), a best friend (n = 9, 6.6%), a sibling (n = 6, 4.4%), a roommate (n = 3, 2.2%), and a sorority sister (n = 2, 1.5%). Additionally, several participants reported the memorable message came from an "other" source, including: a family member (e.g., cousin, aunt/uncle, parent; n = 22, 16.1%), an instructor (e.g., teacher, tutor, or guest speaker; n = 17, 12.4%), a medical professional (e.g., doctor, family physician, pharmacist; n = 5, 3.6%), a colleague or acquaintance (e.g., floor mate, friend of a friend, co-worker, supervisor; n = 5, 3.6%), news or media (n = 4, 2.9%), health and/or education programs (e.g., DARE, UT orientation, UT alcohol program; n = 4, 2.9%), a

family friend, (n = 3, 2.2%), and other sources (e.g., boyfriend, user on online message board, online; n = 5, 3.6%).

Closeness and Similarity to the Sender of Memorable Messages

Research Question 4 sought to determine how the themes of memorable messages vary by relational closeness and similarity, and Research Question 5 asked how the valence of memorable messages are related to closeness and similarity to the memorable message sender. To assess RQ4 and RQ5, a series of one-way ANOVAs were conducted. For this study, the independent variable was the categorical variable of message theme based on the qualitative analysis, or message valence, and the dependent variables were the continuous variables of relational closeness and similarity, respectively. Levene's test indicated unequal variances between memorable message theme and closeness, $F(2,126) = 4.29$, $p < .05$, thus the Welch ANOVA was used. The Welch analysis of variance showed that memorable message theme was not significant for closeness: $F(2,77.97) = 1.25$, $p = .29$. There was also not a significant association between memorable message theme and similarity: $F(2,126) = .87$, $p = .42$. Additionally, the analysis of variance showed that memorable message valence was not significant for closeness, $F(2,134) = .06$, $p = .94$, or similarity, $F(2,134) = .11$, $p = .90$. Hence, in the present study, valence and theme of the memorable message were not associated with how close or similar the participant perceived themselves to be with the message sender.

Testing the Theory of Planned Behavior

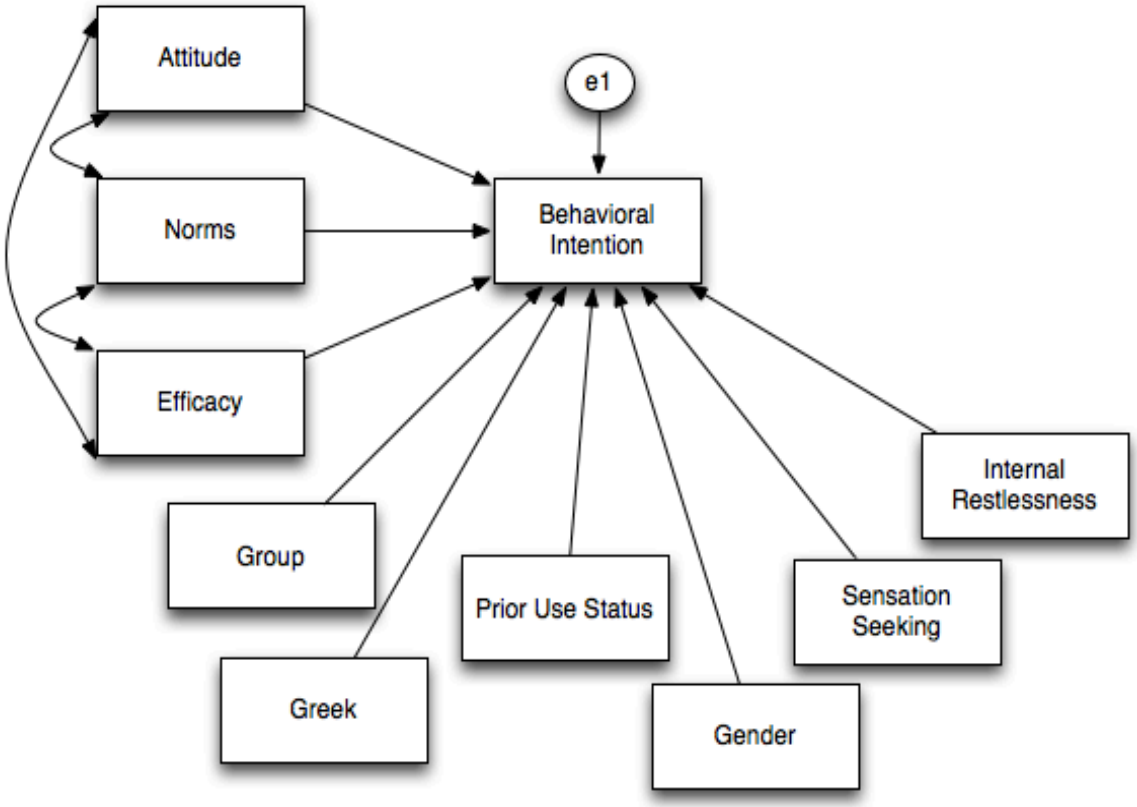
Plan of analysis.

Path analysis using structural equation modeling with maximum-likelihood estimation was used to analyze the direct influences of attitudes, norms, and efficacy on behavioral intention. Model fit was determined with the same fit criteria used for the CFA, described previously. If the full model proposed did not have sufficient fit, the model was modified based on theory and modification indices. Finally, the model was inspected to reveal any non-significant paths. If non-significant paths appeared, standard procedures for model trimming and simplification (Kline, 2011) were followed; all non-significant paths were iteratively removed beginning with the least significant path, until only significant paths remained.

Assessing the Theory of Planned Behavior.

Hypothesis 1 suggested that favorable attitudes, perceived norms that others are engaging in MPS, and efficacy will positively predict behavioral intentions to engage in MPS. Additionally, Research Question 6 sought to determine the relative contribution of attitude, perceived norms, and efficacy in predicting MPS intentions among college undergraduates. Path analysis using AMOS was utilized to assess Hypothesis 1 and Research Question 6 following the plan of analysis described previously. The TPB model was constructed, and the control variables of sample group, Greek status, gender, sensation seeking, internal restlessness, and prior use status with direct paths from each variable to the outcome variable (i.e., behavioral intention) were included (see Figure 4).

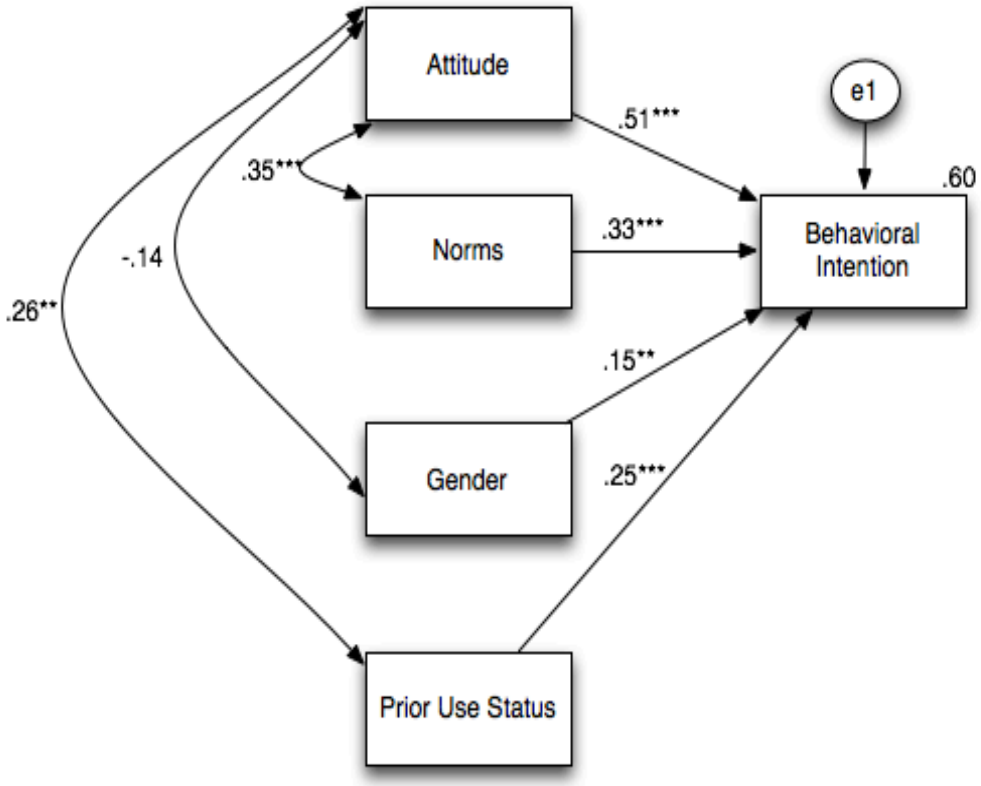
Figure 4: Hypothesized Model with Controls for Hypothesis 1.



The hypothesized model put forth in Hypothesis 1 was partially supported, but did not fit the data well: χ^2 (33) = 133.46, p <.001, CFI = .61, TLI = .47, RMSEA = .15, and SRMR = .16. An inspection of the modification indices revealed several variables could be correlated to improve model fit. Following the recommendations of the modification indices, model fit was improved and fit the data well: χ^2 (19) = 24.16, p = .19, CFI = .98, TLI = .95, RMSEA = .05, and SRMR = .06.

An inspection of the path estimates revealed several non-significant paths. Consistent with standard procedures for model trimming and simplification (Kline, 2011), all non-significant paths were iteratively removed until only significant paths remained. The trimmed model contained no direct paths from group to intention, internal restlessness to intention, sensation seeking to intention, Greek status to intention, or efficacy to intention; thus these variables were removed from the final model (see Figure 5; Table 15 presents the unstandardized and standardized path coefficients, and significance levels for the final model). The final model was more parsimonious and demonstrated good model fit, χ^2 (3) = 3.42, p = .33, CFI = 1.00, TLI = .99, RMSEA = .03, SRMR = .05. Because the model was nested within the initial hypothesized model, the chi-square test of difference was used, and the model had significantly better fit than the hypothesized model, $\Delta\chi^2$ = 130.04, Δdf = 30, p < .001.

Figure 5: Final Model for Hypothesis 1



Note: * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

As predicted in H1, favorable attitudes about MPS was positively associated with behavioral intention ($\beta = .51$, $z = 8.33$, $p < .001$). Additionally, perceived norms that others were engaging in MPS was positively associated with behavioral intention ($\beta = .33$, $z = 5.64$, $p < .001$). There was a positive association between prior use status and behavioral intention ($\beta = .25$, $z = 4.45$, $p < .001$). Finally, there was a positive association

between gender and behavioral intention (β = .15, z = 2.67, p < .01) with females reporting a greater intent to use. The variance explained in behavioral intentions was 60.4%, (R^2 = .60, CI: .05, .49, p < .01). Thus, Hypothesis 1 was partially supported. In response to Research Question 6, favorable attitudes about MPS seemed to have the strongest association with behavioral intention, followed by norms, for the current population (i.e., college undergraduates enrolled in the University) and the current context (i.e., MPS). Efficacy did not have an association with behavioral intention.

Table 15. Unstandardized and Standardized Path Coefficients, and Significance Levels for the Final Model in Figure 5.

Parameter Estimate	*Unstandardized*	*Standardized*	*p*
Attitude → Behavioral Intention	.69 (.08)	.51	<.001
Norms → Behavioral Intention	.46 (.08)	.33	<.001
Gender → Behavioral Intention	.74 (.28)	.15	<.01
Prior Use Status → Behavioral Intention	.98 (.22)	.25	<.001

Note: χ^2 (1) = 1.09, p = .370 CFI = 1.00, TLI = 1.00, RMSEA = .03, SRMR = .03. (Standard Errors in Parentheses; N = 137)

Integrating Memorable Message Features into the Theory of Planned Behavior

A series of one-way ANOVAs was conducted to answer Research Question 7, which sought to determine how the features of memorable messages (i.e., message theme, message source, and message valence) were related to attitudes, perceived norms, and efficacy about MPS among college undergraduates. Research Question 8 sought to determine which themes of the memorable messages are associated with intention to engage in MPS.

Message theme.

The three memorable message themes of academics, health outcomes, and responsible use, derived from the qualitative portion of this dissertation, were combined into a categorical variable of message theme and entered as the independent variable in the ANOVA. The individual TPB variable of attitudes, norms, or efficacy was entered as the dependent variable. The analysis of variance showed that attitudes, $F(2,126) = .08$, $p = .93$, norms, $F(2,126) = 1.01$, $p = .37$, and efficacy, $F(2,126) = 2.36$, $p = .10$, did not vary by memorable message theme. To assess RQ8, a one-way ANOVA was conducted, with message theme as the independent variable and intention as the dependent variable, but it was not significant: $F(2,126) = .28$, $p = .76$.

Message source.

The seven memorable message sources, described previously, were combined into a categorical variable of message source and entered as the independent variable in the ANOVA. The individual TPB variable of attitudes, norms, or efficacy was entered as the dependent variable. The analysis of variance showed that attitudes, $F(6,130) = 1.29$, $p =$

.27, and norms, $F(6,130) = .99$, $p = .43$, did not vary by message source. The ANOVA was significant for efficacy: $F(6,130) = 2.64$, $p < .05$. Post hoc comparisons using the Tukey HSD test indicated that the mean score for friends (n =38, $M = 5.94$, $SD = .66$) was significantly different than the "other" group ($n = 65$, $M = 5.34$, $SD = 1.02$), which included eight categories: family member, medical professionals, colleague or acquaintance, instructors, health education programs, news or media, a family friend, and online sources as the sender of memorable message senders.

Message valence.

The three categories of message valence (i.e., positive, negative, and neutral) were entered as the independent variable while the individual TPB variable of interest, either attitudes, norms, or efficacy, was entered as the dependent variable for each ANOVA. The analysis of variance showed that attitudes, $F(2,134) = .31$ $p = .74$, and norms, $F(2,134) = .17$, $p = .85$, did not vary by message valence. The Levene's test of homogeneity of variances was significant for efficacy and valence, $F(2,134) = 4.74$, $p = .01$, thus the Welch ANOVA was used. The Welch analysis of variance showed that efficacy also did not vary by message valence, $F(2,61.23) = .76$, $p = .47$.

Examining the Moderating Role of Relational Closeness and Similarity

Research Question 10 sought to determine how the associations between the three TPB variables (i.e., attitude, perceived norms, and efficacy) and intention are moderated by relational closeness with the memorable message sender, while Research Question 11 was interested in the same associations with the moderation of similarity to the message sender. To assess RQ10 and RQ11, a series of hierarchical regressions were

conducted. Behavioral intention was entered as the dependent variable, the control variables of Greek status, prior use status, sensation seeking, and internal restlessness were entered in Step 1, in addition to the other components of TPB (e.g., norms and efficacy were included as a control variables in the analyses of attitudes), the TPB predictor of interest and relational closeness (or similarity) were entered as the independent variables in Step 2, and the two-way interaction of the TPB predictor and relational closeness (or similarity) was entered in Step 3. The three TPB predictors were assessed in separate models and all independent variables were mean centered before creating the interaction terms to avoid any potential problems with multicollinearity with the interaction term (Aiken & West, 1991).

Closeness.

Attitudes were significantly associated with behavioral intention, $\beta = .44$, $t(127) = 6.47$, $p < .001$, but relational closeness, $\beta = .04$, $t(127) = .59$, $p = .55$, as well as the interaction between attitudes and relational closeness, $\beta = .06$, $t(127) = .98$, $p = .33$, were not significant. Norms were also significantly associated with behavioral intention, $\beta = .32$, $t(127) = 4.83$, $p < .001$, but relational closeness, $\beta = .03$, $t(127) = .42$, $p = .68$, and the interaction between norms and relational closeness, $\beta = .07$, $t(127) = 1.18$, $p = .24$, were not significant.

Efficacy approached significance, $\beta = .12$, $t(127) = 1.92$, $p = .057$, but relational closeness was not significantly associated with intention, $\beta = .03$, $t(127) = .49$, $p = .62$. However, the interaction of efficacy and relational closeness was significant, $\beta = -.11$, $t(127) = -1.99$, $p < .05$, CI: -.23, -.001 (see Table 16). The nature of the interaction (see

Figure 6) suggests that those who perceived themselves to have low closeness to the memorable message sender and higher efficacy had higher intentions to engage in MPS than those who had high closeness to the memorable message sender and high efficacy. Specifically, the simple slope for high closeness (i.e., one standard deviation above the mean) is near zero, $b = .03$, $t = 0.15$, $p = .880$, whereas the slope is positive for mean levels of closeness, $b = .26$, $t = 1.92$, $p = .058$, and low closeness (i.e., one standard deviation below the mean), $b = .49$, $t = 2.80$, $p = .006$.

Figure 6. Efficacy X Closeness in Predicting Behavioral Intention.

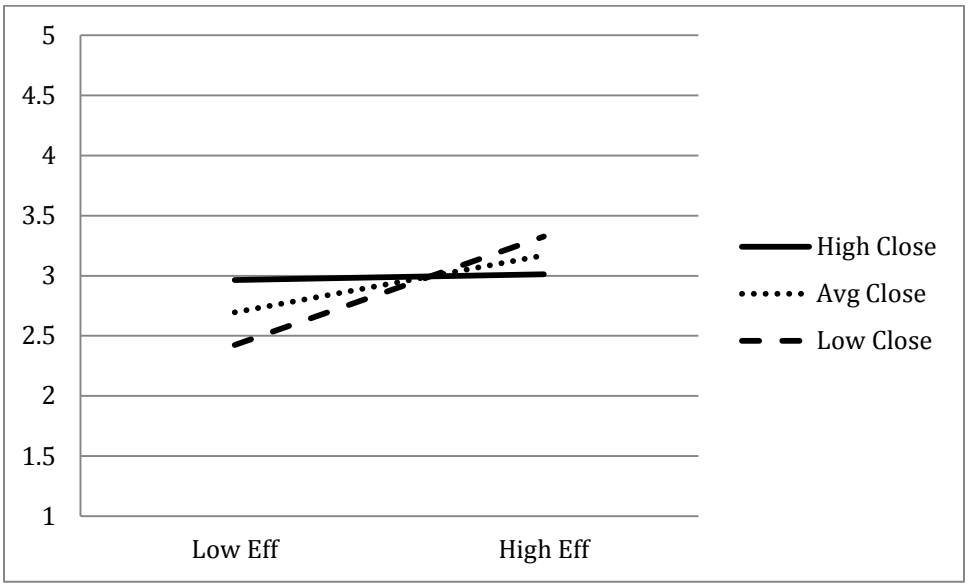


Table 16. Regression Results for Closeness Analyses

Attitudes		β	*t*	ΔR^2 for step
Step 1	Greek Status	.05	0.69	.47***
	Prior Use Status	.32	4.74***	
	Sensation Seeking	.04	0.63	
	Internal Restlessness	.13	1.85[m]	
	Norms	.41	5.67***	
	Efficacy	.20	2.90**	
Step 2	Attitudes	.45	6.63***	.14***
	Closeness	.03	0.54	
Step 3	Attitudes X Closeness	.06	0.98	.003
Norms				
Step 1	Greek Status	.07	1.13	.53***
	Prior Use Status	.24	3.64***	
	Sensation Seeking	.00	0.01	
	Internal Restlessness	.11	1.71 [m]	
	Attitudes	.53	7.28***	
	Efficacy	.10	1.53	
Step 2	Norms	.32	4.77***	.08***
	Closeness	.03	0.54	
Step 3	Norms X Closeness	.07	1.18	.004
Efficacy				
Step 1	Greek Status	-.01	-0.19	.60***
	Prior Use Status	.26	4.36***	
	Sensation Seeking	-.04	-0.57	
	Internal Restlessness	.07	1.11	
	Attitudes	.48	7.12***	
	Norms	.31	4.81***	
Step 2	Efficacy	.12	1.88 [m]	.013
	Closeness	.03	0.54	
Step 3	Efficacy X Closeness	-.11	-1.99*	.012*

Note: N = 137. [m]$p < .10$, *$p < .05$, **$p < .01$, ***$p < .001$.

Similarity.

Attitudes were significantly associated with behavioral intention, β = .45, t(127) = 6.61, p < .001, but similarity, β = -.10, t(127) = -1.82, p = .07, as well as the interaction between attitudes and similarity, β = .07, t(127) = 1.18, p = .24, were not significant. Norms were also significantly associated with behavioral intention, β = .36, t(127) = 5.52, p < .001, but similarity, β = -.10, t(127) = -1.82, p = .07, and the interaction between norms and similarity, β = -.09, t(127) = -1.55, p = .12, were not significant. Efficacy was significantly associated with behavioral intention, β = .14, t(127) = 2.26, p < .05, while similarity was not significantly associated with behavioral intention, β = -.09, t(127) = -1.56, p = .12. The interaction between efficacy and similarity was not significant, β = -.09, t(127) = -1.58, p = .12, see Table 17.

Table 17. Regression Results for Similarity Analyses

Attitudes		β	*t*	ΔR^2 for step
Step 1	Greek Status	.05	0.69	.47***
	Prior Use Status	.32	4.74***	
	Sensation Seeking	.04	0.63	
	Internal Restlessness	.13	1.85[m]	
	Norms	.41	5.67***	
	Efficacy	.20	2.90**	
Step 2	Attitudes	.45	6.70***	.15***
	Similarity	-.10	-1.77[m]	
Step 3	Attitudes X Similarity	.07	1.18	.004
Norms				
Step 1	Greek Status	.07	1.13	.53***
	Prior Use Status	.24	3.64***	
	Sensation Seeking	.00	0.01	
	Internal Restlessness	.11	1.71[m]	
	Attitudes	.53	7.28***	
	Efficacy	.10	1.53	
Step 2	Norms	.35	5.30***	.09***
	Similarity	-.10	-1.77[m]	
Step 3	Norms X Similarity	-.09	-1.55	.007
Efficacy				
Step 1	Greek Status	-.01	-0.19	.60 ***
	Prior Use Status	.26	4.36***	
	Sensation Seeking	-.04	-0.57	
	Internal Restlessness	.07	1.11	
	Attitudes	.48	7.12***	
	Norms	.31	4.81***	
Step 2	Efficacy	.14	2.22*	.02*
	Similarity	-.10	-1.77[m]	
Step 3	Efficacy X Similarity	-.09	-1.58	.007

Note: (N = 137) [m]$p < .10$, *$p < .05$, **$p < .01$, ***$p < .001$.

The Role of Memorable Messages in Changes to the Theory of Planned Behavior Predictors

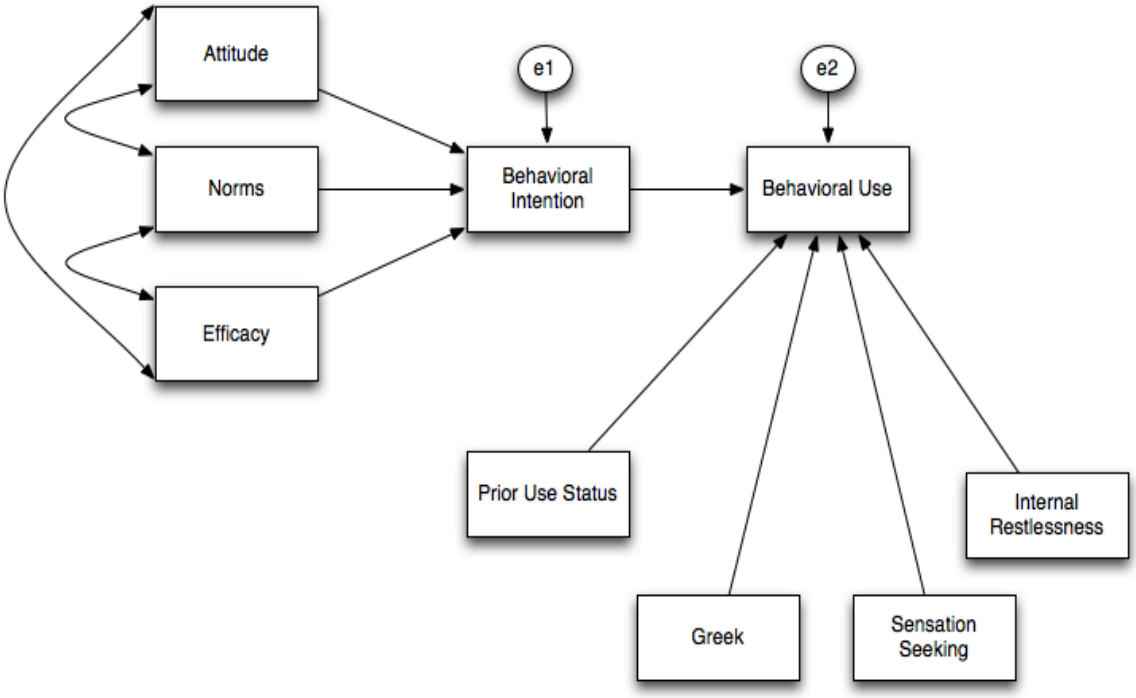
A series of repeated measures analysis of variance models were utilized to assess Research Question 9, which sought to determine if attitudes, normative beliefs, or efficacy change as a result of receiving a memorable message about prescription stimulants. RM-ANOVA is appropriate when assessing trends over time (Stevens, 2009). RM-ANONVA seeks to detect any overall differences between the related means. For this study, the independent variable was the categorical variable of time, and the dependent variables are the continuous variables of attitude, norms, and efficacy, respectively. For the series of RM-ANOVAs, only cases with a memorable message reported at Time 2 were included (n = 52); this subsample included 37 participants from the 89 participants who completed the follow-up study, and an additional 15 participants who did not report a memorable message at Time 1 but did report a memorable message at Time 2.

The RM-ANOVA showed that the effect of receiving a memorable message was not significant for attitudes: Wilk's Lambda = .99, $F(1,51) = .37$, $p = .55$. The RM-ANOVA was significant for the effect of receiving a memorable message for norms: Wilk's Lambda = .90, $F(1,51) = 5.52$, $p < .05$, partial $\eta^2 = .10$. Pairwise comparisons indicated that perceptions of others engaging in MPS increased when receiving a memorable message about MPS between Time 1 (M = 2.52, SD = 1.49) and Time 2 (M = 2.83, SD = 1.61). Finally, the effect of receiving a memorable message was not significant for efficacy: Wilk's Lambda = .98, $F(1,51) = 1.17$, $p = .28$.

Predicting Use: The Role of Behavioral Intention

Hypothesis 2 posited that intentions at the beginning of the semester to engage in MPS will be positively associated with behavioral use at the end of the semester. Path analysis using AMOS was utilized to assess Hypothesis 2 following the plan of analysis for Hypothesis 1, described previously. For the analysis, the subsample of 89 participants who completed the follow-up survey at Time 2 was included. The TPB model was constructed, and the control variables of Greek status, prior use status, sensation seeking, and internal restlessness with direct paths from each variable to the outcome variable of behavioral use, were included (see Figure 7).

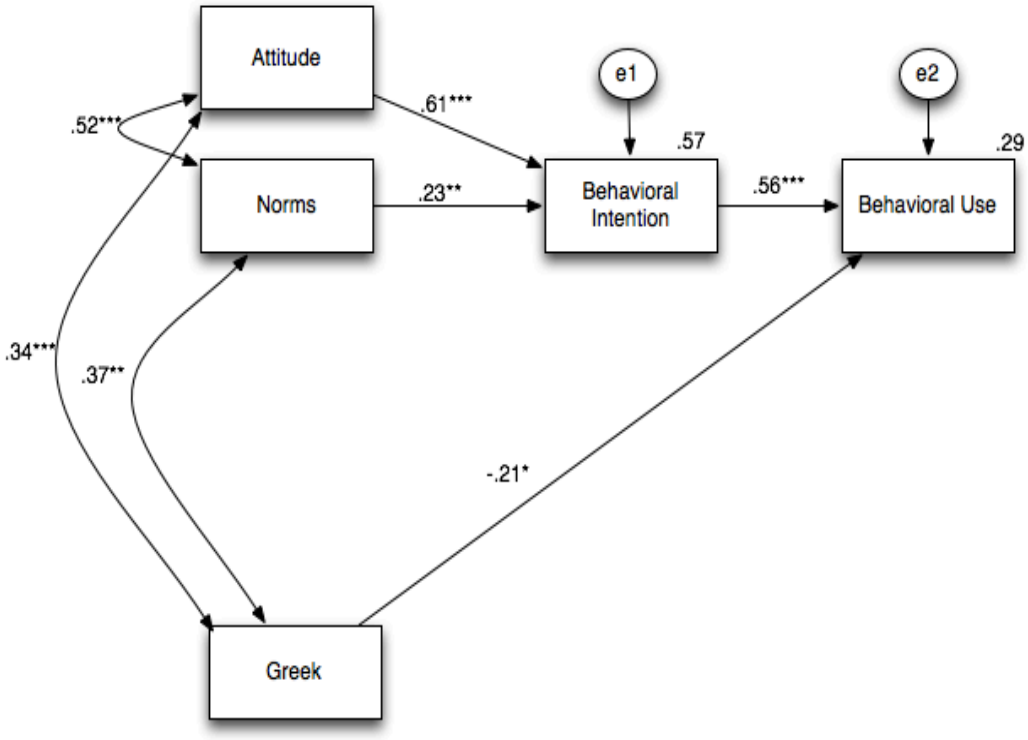
Figure 7. Hypothesized Model with Controls for Hypothesis 2.



The model posited in Hypothesis 2 was supported, but did not fit the data well: χ^2 (25) = 102.55, p <.001, CFI = .64, TLI = .48, RMSEA = .19, and SRMR = .23. An inspection of the modification indices revealed several variables could be correlated to improve model fit. Following the recommendations of the modification indices, model fit was improved and fit the data better but not adequately: χ^2 (17) = 38.88, p < .01, CFI = .90, TLI = .78, RMSEA = .12, and SRMR = .14.

An inspection of the path estimates revealed several non-significant paths. Consistent with standard procedures for model trimming and simplification (Kline, 2011), all non-significant paths were iteratively removed until only significant paths remained. The trimmed model contained no direct path from efficacy to intention, internal restlessness to behavioral use, sensation seeking to behavioral use, or prior use status to behavioral use, thus these variables were removed from the final model (see Figure 8; Table 18 presents the unstandardized and standardized path coefficients, and significance levels for the final model). The final model was more parsimonious and demonstrated good model fit, χ^2 (3) = 3.25, p = .35, CFI = 1.00, TLI = .99, RMSEA = .03, SRMR = .03, and had significantly better fit than the hypothesized model, $\Delta\chi^2$ = 99.30, Δdf = 22, p < .001.

Figure 8. Final Model for Hypothesis 2



Note: *$p \leq .05$; **$p \leq .01$; ***$p \leq .001$

As predicted in H2, behavioral intention at Time 1 was positively associated with behavioral use at Time 2 ($\beta = .56$, $z = 5.98$, $p < .001$). Additionally, attitudes at Time 1 were positively associated with intentions at Time 1 ($\beta = .61$, $z = 7.36$, $p < .001$), and norms that others were engaging in MPS at Time 1 were positively associated with behavioral intentions at Time 1 ($\beta = .23$, $z = 2.84$, $p < .01$). Finally, Greek affiliation was negatively associated with behavioral use at Time 2 ($\beta = -.21$, $z = -2.21$ $p < .05$), such that those affiliated with a Greek organization were less likely to have engaged in MPS at

Time 2. The variance explained in behavioral intentions was 56.8% (R^2 = .57, CI: .42, .68, p = .001), and the variance explained in behavioral use was 29.1% (R^2 = .29, CI: .11, .46, p = .001). Thus, Hypothesis 2 was supported.

Table 18. Unstandardized and Standardized Path Coefficients, and Significance Levels for the Final Model in Figure 8.

Parameter Estimate	*Unstandardized*	*Standardized*	*p*
Attitude → Behavioral Intention	.79 (.11)	.61	<.001
Norms → Behavioral Intention	.34 (.12)	.23	<.01
Behavioral Intention → Behavioral Use	.14 (.02)	.56	<.001
Greek → Behavioral Use	-.24 (.11)	-.21	<.05

Note: χ^2 (3) = 3.254 p = .35, CFI = 1.00, TLI = .99, RMSEA = .03, SRMR = .03. (Standard Errors in Parentheses; N = 89)

Chapter Six: Discussion

This study represents a first step in understanding the role of interpersonal communication in the formation of attitudes, normative beliefs, efficacy, and intention development in regard to misuse of prescription stimulants (MPS). Given the high prevalence of MPS on college campuses across the country (Johnston et al., 2013), as well as the high prevalence rates of MPS in the current study (52.6%), it seems likely that conversations about MPS among students are relatively commonplace. In the current study, I addressed this assumption by examining the ways in which memorable messages might shape college students understandings of illicit stimulant use behavior.

The findings from the qualitative memorable messages paint a picture of "MPS talk" between college students and a variety of sources—ranging from friends and peers, instructors, acquaintances, family members and medical professionals. Overall, two overarching findings regarding the interplay of MPS memorable messages and behavioral intention emerged from this dissertation. First, findings indicate that college students do receive, and remember, messages about the use of prescription stimulants. The following themes emerged as representing the types of messages undergraduates' recall: Academics, Responsible Use, and Health Outcomes. Secondly, memorable messages about MPS are interpreted as more negative than positive.

Additionally, five overarching findings regarding behavioral intention formation and use of prescription stimulants emerged from this dissertation. First, the quantitative results contextualized behavioral intentions, and actual MPS use behaviors of college students at this university, by demonstrating that attitudes and normative beliefs were

positively associated with behavioral intention. Secondly, closeness with the memorable message sender moderated the relationship between efficacy and intention. Thirdly, although the specific message themes and message valence were unrelated to the attitudes, normative belief, efficacy, and behavioral intention, the source of the message did vary with regard to efficacy. Thus, it may be that relational characteristics with the message sender play a role in the intention development of student engagement in MPS. Fourth, the findings from the longitudinal analyses indicated normative beliefs that others were engaging in MPS increased by receiving a memorable message between Time 1 and Time 2. Finally, the findings of the dissertation further indicated that behavioral intentions at Time 1 are positively associated with behavioral use at Time 2 for MPS at this university.

To further explore these findings, a description of the themes, valence, and sources of memorable messages from the qualitative analysis is presented with a discussion of their significance for the development of health promotion and education materials in the context of MPS. Then, the findings from the cross-sectional and longitudinal analyses associated with the Theory of Planned Behavior (Ajzen, 1985, 1991) are elaborated upon, and implications are presented. Afterward, a discussion of the limitations of the current study is presented. Then, a variety of strengths and challenges for the empirical examination of memorable messages about stimulant use among college undergraduates is described including a discussion of theoretical and methodological strengths and challenges, which leads to a discussion of directions for future research and the practical implications of this research.

EXAMINING "MPS TALK": MEMORABLE MESSAGE CHARACTERISTICS

An examination of the memorable messages revealed interesting findings concerning prescription stimulants. The first set of research questions (RQs 1-3), concerned the themes, sources, and valence of memorable messages about prescription stimulants. Research Question 1 was addressed using qualitative analysis of the memorable message, while descriptive data were used to assess Research Questions 2 and 3. The findings of the current study add to the literature by highlighting the ways in which memorable messages may frame young adults' understanding about MPS.

First, the qualitative results indicate that undergraduates recall a variety of messages about prescription stimulants as an academic aid, including messages about the norms of use among college students, responsible use of MPS, as well as messages about health concerns of MPS. The theme of academics in the current study builds upon extant literature which suggests that MPS is common for academic motivations such as staying awake and alert as well as concentrating longer (DeSantis et al., 2008; Hernandez & Nelson, 2010; Rabiner et al., 2009a, 2009b; Teter et al., 2006). Because research suggests that MPS can, in fact, increase academic performance in the short-term (Advokat, 2010), it seems messages that focus on MPS as an academic aid may be proliferating this belief as the memorable messages reported by undergraduates indicate they are receiving, and remembering, information that MPS can aid academic performance by helping with alertness and concentration.

Long-term academic performance, however, can suffer as a result of MPS (Evans et al., 2001; McCabe et al., 2006b); yet, the memorable messages undergraduates recall about MPS and academics seem to be focused on the short-term, seemingly "positive"

outcomes. This lack of knowledge about the long-term academic and health consequences provides an opportunity for future health education work to disseminate information about the negative long-term academic impact of MPS.

Additionally, the Academic subtheme of social perceptions/norms demonstrates that not only do undergraduates have a normative belief that other students are engaging in MPS, as suggested by the quantitative findings of this research, this belief is shared through communication with peers and friends, and then later recalled as memorable. Because messages that are considered memorable are those that the receiver perceives to have an influence on his or her life (Knapp et al., 1981; Stohl, 1986), it seems likely that the perceptions that others are engaging in MPS, and are getting an unfair advantage as this study suggests, may be particularly relevant to the recipient.

Further, previous research on college students' justification for their illegal use of prescription stimulants suggests that students believe they will not be injured, MPS is not "inappropriate," and "everybody else is doing it" (Cutler, 2014, p. 484), highlighting again the normative messages undergraduates may share. Normative beliefs are assessments an individual makes about the beliefs or behaviors other people demonstrate (Real & Rimal, 2007). By talking to a friend, an individual can understand what beliefs that person holds, how widely those beliefs are shared, and whether others expect them to hold similar beliefs or engage in similar behaviors (Real & Rimal, 2007). As the bulk of memorable messages in this study were sent from friends and peers (as found in RQ3), it seems clear that normative beliefs are developing through communication with friends and peers.

Future health promotion and education campaigns could provide undergraduates with tips and strategies for having conversations with their friends about MPS, as well as provide them with *factual* information to share about the risks and consequences of engaging in MPS. Although the literature suggests memorable messages tend to be from close others (Holladay, 2002), this study indicates that the information presented through health education and media campaigns can also be recalled as memorable. It may be that in the context of adverse health behaviors, such as MPS, people recall formal health messages as memorable. In a review of recent scholarship, Southwell and Yzer (2009) suggest that interpersonal talk and campaigns intersect such that when people are presented with information that is threatening to them they talk to others (see Compton & Pfau, 2009). Further, Southwell and Yzer suggest campaigns can resonate with people if the messages are spread through informal channels (Morgan, 2009). It could be that the health education campaigns that students report as memorable messages may lead to future conversations about MPS. Future research should examine this possible link.

These examples also highlight that the memorable messages students are reporting may include pieces of advice (e.g., "Adderall is the best! It makes you so productive, if you try it you'll get EVERYTHING you need done"). If a student is thinking about engaging in illicit stimulant use, they may choose to consult a friend for information related to use, outcomes, side effects, or information about obtaining stimulants. Omarzu's (2000) disclosure decision model suggests that disclosure is a conscious choice based upon the goals that an individual wants to achieve by disclosing; however, the benefit of obtaining those goals is weighed against the risk of disclosing.

Friends help each other reach goals and accomplish everyday tasks, such as sharing information about courses or helping with homework (Argyle & Henderson, 1984; Fehr, 1996; Wright, 1978, 1984). Recent research suggests that some students are willing to provide information to their friends about MPS, whether directly or indirectly, while other students avoid talking about the topic altogether (Champlin, Crook, Donovan, & Mackert, 2015). Because people respond to advice in varying ways (Cutrona & Suhr, 1994; Goldsmith, 2004), future interpersonal and health communication research should further examine the actual conversations that occur about MPS among college students, with a focus on how students respond to these messages.

In addition to students receiving a wide variety of MPS messages, the second implication of the qualitative component of this dissertation is that, contrary to the notion that memorable messages are usually more positive than negative (Knapp et al., 1981; Stohl, 1986), the findings for RQ2 in the present study suggest that participants tended to frame memorable messages about prescription stimulants in a negative light. It may be that when discussing a more sensitive or risky topic, such as illicit drug use behaviors, messages may be negative because they focus on topics including negative health consequences such as side effects and dependency issues as well as responsible use such as legality concerns. In fact, the second main theme of the qualitative analysis focused on health outcomes. The majority of these messages focused on the negative or unknown implications of engaging in MPS such as damage to organs, dependency issues, and physical as well as psychological side effects. However, a few memorable messages highlighted seemingly "positive" health outcomes, specifically MPS as a strategy for

weight loss. These messages are consistent with existing literature that suggests undergraduates take illicit stimulants to lose weight (DeSantis et al., 2008; Teter et al., 2006). The third theme of the memorable messages focused on responsible use, and it highlights messages that focus on perceptions of general dangerousness and the legality of MPS. Despite participants of the current research rating MPS as fairly low in perceived harmfulness (10^{th} out of 13 drugs), the messages that they recall as memorable do focus on the risk of using stimulants without a prescription.

In sum, the two primary implications about MPS memorable messages include that undergraduates do recall receiving messages that are memorable about MPS, from a variety of sources, and on the whole, these messages are perceived as having negative valence. Next, the five implications of the quantitative component of this work are presented.

EXPLAINING BEHAVIORAL INTENTION: TESTING THE THEORY OF PLANNED BEHAVIOR

The results of the current investigation provide several new insights into how undergraduates' attitudes and normative beliefs about MPS contribute to their behavioral intention to engage in MPS. One of the central tenets of TPB states that the relative influence of attitudes, norms, and efficacy varies across behaviors and situations (Ajzen, 1991). Additionally, Gallucci and colleagues (2015) call specifically for research to examine the degree to which the constructs of TPB explain MPS among college students.

Hypothesis 1 posited that favorable attitudes, normative beliefs that others are engaging in MPS, and efficacy would positively predict behavioral intentions to engage in MPS. The primary study mostly supported Hypothesis 1, with favorable attitudes and

normative beliefs that others were engaging in MPS being significant predictors of behavioral intention. Efficacy, however, was not found to be significantly associated with behavioral intention.

Contrary to research by Gallucci and colleagues (2015), as well as Judson and Langdon (2009), independent samples *t*-tests for the TPB variables by prior use status showed that those individuals who engaged in MPS had higher efficacy beliefs than never users. It may be that the operationalization of the variable of efficacy played a role for these differences, as well as the non-significant findings in the TPB model. For example, the items designed by Gallucci and colleagues (2015), as well as Judson and Langdon (2009), assessed perceived control focused on needing prescription stimulant medication to concentrate in classes, catch up on work, and feeling the benefits outweighed the harms.

On the other hand, the items created for this research focused assessments of individuals efficacy beliefs—beliefs about being able to perform or refrain from engaging in MPS as well as being capable to obtain stimulants. It may be that the perceived ease of obtaining stimulants, knowing how to use them, and resisting the urge to engage in MPS if in possession of stimulants does not present a barrier to intention (Fishbein & Yzer, 2003). Although health behaviors theories (i.e., TPB, and its extension The Integrated Model of Behavioral Prediction, Fishbein, 2002; Fishbein et al., 2002) aim at removing environmental barriers for healthy behaviors, it may be, in the case of MPS, that barriers might be necessary for students to *not* engage in MPS. As Yzer and van den Putte (2014) argue, perceived control, or efficacy, predicts intention when the individual holds a

positive attitude toward the behavior or when the normative belief favors the behavior under question. Students might believe MPS is under their control, but they evaluate the behavior negatively, and thus, was not related to intention in the current study. Future research should investigate a possible interaction of efficacy on the effects of attitude and normative belief on intention as TPB theorists have suggested that conceptually, perceived efficacy should moderate attitudinal and normative effects on intention (see Ajzen, 2002; Fishbein & Ajzen, 2010). On the practical side, health education campaigns could focus on targeting current prescription holders and highlight the negative effects of diverting their medication to others, thus creating a barrier in ease of obtainment for prior users.

Not surprisingly, the control variable of prior MPS was also significantly and positively associated with behavioral intention, such that those who had reported previous MPS reported higher behavioral intentions to engage in MPS. Additionally, gender was significantly related to behavioral intention, such that females reported higher behavioral intentions than males. However, this finding should be interpreted with caution as the results on gender are mixed (Herman-Stahl et al., 2007; Low & Gendaszek, 2002; McCabe et al., 2005; SAMHSA, 2009; White et al., 2006).

Research Question 6 sought to determine the relative contribution of each of the TPB constructs. The findings of the overall model from the primary study suggest that attitudes were the strongest predictor of behavioral intention, followed by normative belief. Thus, future health education campaigns and interventions should specifically target favorable attitudes about MPS at the University. Judson and Langdon (2009)

advocate for increasing awareness about the actual adverse health outcomes of MPS. This study further advocates that future interventions should highlight the negative relationship between MPS and academic performance, as that could create a less favorable attitude about MPS and may result in a reduction of the likelihood to engage in MPS.

Integrating memorable message features to predict behavioral intention.

Research Question 7 sought to determine how the features of memorable messages were related to the TPB variables. The valence of memorable messages was unrelated to attitudes, normative belief, efficacy, and behavioral intention. It may be that the tone of one, specific message itself is not strong enough to make an impact on attitudes, norms, efficacy, or intention. Rather, receivers of memorable messages may rely on several other cues to develop their intention to engage in MPS. Further, the source of memorable messages was also not related to attitudes, normative belief, or behavioral intention. If the interpretation of memorable message is based upon the attributions that the receiver makes in regard to the reason behind the source's message (Bradbury & Fincham, 1990; Holladay, 2002), the perceived intentions of the sender may influence the receiver's intent to use prescription stimulants. Thus, it may be important to explore the personal characteristics of the message sender (i.e., their goals or motivations for talking about MPS), the message receiver (i.e., their goals or motivations for MPS, descriptive and injunctive norms, outcome expectations, and perceptions of dangerousness), and the relationship between the message sender and message receiver (i.e., interpersonal trust and closeness) and as these characteristics likely influence message interpretation, to

further determine how memorable messages influence attitudes, norms, or behavioral intention.

The findings of this study suggest that memorable messages from friends were related to greater efficacy than messages from the category of "other" which included: family members, medical professionals, colleague or acquaintances, instructors, health education programs, news or media, family friends, and online sources as the sender of memorable message senders. During times of distress young adults are more likely to seek out their friends for help and advice (Buhrmester, 1990); thus, communicated support is important in evaluating the characteristics and features of memorable messages received from friends, in influencing behavioral intention and actual behavior to engage in illicit stimulant use. Friends provide benefits (Burleson, 1995) including enjoyment, help, social support, acceptance, and having a confidant (Rawlins, 1992; Reohr, 1991) that may differ from medical professionals, health education sources, as well as the news and media. A commonly reported benefit of friendship is having someone to talk to (Duck & Wright, 1993; Monsour, 1992; Parks & Floyd, 1996; Rawlins, 1992; Reohr, 1991), and young adults may seek to communicate with a friend in times of need because of what they need, want, or expect from the friend (Goldsmith, 2004). Burleson and Samter (1994) suggest that it is through communication that friends are able to enact the functions (e.g., social support) that are considered critical to friendship, suggesting that people are socialized to hold expectations about friendships (Samter & Cupach, 1998). The role of a friend is to be supportive, accepting, and helpful (Reohr, 1991), and friends

may provide support that makes the individual feel good about him or herself and encourages them to achieve their personal goals (Burleson et al., 1992).

Further, it may be that friends and peers are sending different types of messages as compared to "other" sources such as medical professionals, the news and media, and health education campaigns. In fact, a post-hoc chi-square test of independence revealed significant differences between the message source category of friends and others regarding message theme, χ^2 (2, n = 96) = 26.67, $p < .001$, $\Phi = .53$, $p < .001$, such that friends (n = 20) were sharing more messages focused on the theme of academics as compared to the "other" category (n = 7), while friends shared fewer messages about the theme of responsible use (n = 2), compared to the category of "other" (n = 27), and friends shared fewer messages about health outcomes (n = 15), compared to the "other" category (n = 25). Thus, it may be that the types of messages that friends share about academics, which tended to be more positive about MPS, lead to greater efficacy beliefs than messages shared from other sources.

Relational characteristics with the message sender as moderators.

The present study additionally examined the moderating role of relational closeness and similarity to the memorable message sender and found that closeness moderated the influence of efficacy on behavioral intention such that if the participant reported high efficacy beliefs regarding MPS, but also perceived themselves to be less close to the memorable message sender, they had higher behavioral intentions to engage in MPS. In contrast, those with low efficacy and low closeness reported the lowest intent. It may be that there is a sort of anonymity effect, such that individuals have stronger

intent if they are less familiar with the memorable message sender and have greater efficacy. Further, intent did not vary based on efficacy at high levels of closeness to the memorable message sender; it only varied for low closeness.

Morgan and Grube (1991) found that several close friends were important in drug use initiation, but the best friend had a more critical role in the maintenance of drug use. Further, Kandel (1985) suggested that the influence of peers depended on the substance under investigation—it may that, for MPS, closeness to the message sender plays a different role, such that being less close to the message sender may increase perceptions of anonymity to the drug misuse and yield greater behavioral intentions. Thus, if students perceive they have strong efficacy beliefs to obtain and successfully use prescription stimulants, they may not need the perceived support or approval of their close friends to have behavioral intentions to engage in MPS. Alternatively, perhaps if closeness is controlled in the TPB model (Hypothesis 1), efficacy may emerge as a significant predictor of behavioral intention for this sample. It is important to note, however, that these interpretations should be made with caution as this was the only interaction effect and there were no strong patterns that emerged from the data regarding the moderating role of closeness with the other TPB predictors.

Additionally, similarity was not found to be a moderator between the TPB variables and behavioral intention. It may also be that MPS is an individual, rather than social, behavior (i.e., taking stimulants to stay awake and study alone as compared to drinking with friends). Though research has found social motivations for MPS, such as

staying awake longer to party with friends, it may be perceived as a more autonomous behavior, and the characteristic of similarity to the message sender may not play a role.

Additionally, future research should explore the effect of memorable message valence to further understand how closeness, or similarity, may moderate the relationship between the TPB variables and behavioral intention. It may that if a student receives a memorable message with positive valence from a source with whom they are close, they might have more favorable attitudes, stronger normative beliefs, or strong efficacy beliefs. Future research should tease out these potential relationships.

EXPLAINING PRESCRIPTION STIMULANT USE: LONGITUDINAL ANALYSES

It is not surprising that normative beliefs increased over the course of the study (Research Question 9) as social perceptions and norms that others were engaging in MPS were also found to be a commonly-reported theme of memorable messages in the current study. In a similar context of alcohol use, Real and Rimal (2007) found that communication with peers was a significant predictor of intention to consume alcohol. Additionally, they found the relationship between descriptive norms and alcohol consumption was stronger among students who talked more about those behaviors with their peers than those who did not (Real & Rimal, 2007). As suggested by TPB, it is the individual's perceptions of the attitudes and behaviors of one's network members, rather than the actual behaviors of those peers, that exert the strongest influence in engaging in deviant behavior (Duan et al., 2009).

Further, this research posits that it may be that through conversation with peers and friends over the course of the semester (i.e., a memorable message shared between

the two time points assessed in the present study), students become exposed to more conversations, shared stories, or anecdotes that other students may be engaging in MPS, thus increasing their normative beliefs. Scholarship suggests that students view stimulant use as physically and psychologically benign and morally acceptable since it is used for academic purposes; that is, they see it as stigma-free (DeSantis et al., 2008), which may be related to the positive attitudes undergraduates hold about MPS, as well as the increase in normative belief over the course of the semester, as represented in changes in normative beliefs at Time 2. Future research should further explore the effect of memorable message valence to further understand the change of attitude, normative belief, and efficacy as a result of receiving a memorable message about MPS. It may be that valence helps to delineate the changes of attitudes, norms, and efficacy beliefs over time.

Additionally, in the current study, behavioral intention at Time 1 was positively associated with MPS at Time 2, thus providing additional support for TPB in the context of MPS. Because young adults who misuse prescription stimulants are thought to be struggling with the adjustment to college (Custode & Norvilitis, 2012), peer mentors, resident advisors, and academic counselors have an opportunity to play a role throughout the semester by helping students' transition to the academic and social demands of college life. These resources may ease the adjustment to college and lessen the prevalence of MPS during college. Future research should explore this possible connection.

Limitations

This study contributes to the theoretical and practical understanding of the relationship between college student socialization and intention and use of illicit prescription stimulants among undergraduates, yet the findings of this dissertation need to be considered in light of its limitations. The first limitation of the study is that data were collected through convenience sampling, utilizing an undergraduate student sample at one university. Further, TPB suggests that the relative contribution of each of the three factors (i.e., attitudes, normative belief, perceived efficacy) vary according to the specific behavior and population under inquiry (Ajzen, 1991). Thus, the results of this dissertation are only immediately applicable to undergraduate students at this University, and thus may not be generalizable to the entire corpus of students in college, or to all young adults.

Secondly, data collection relied on self-report methods, which are faced with a variety of challenges including social desirability. Because participants reported on a sensitive topic (e.g., their own MPS or intention to engage in MPS), they may have been reluctant to provide accurate information about activities that are illegal or socially undesirable (Durant, Carey, & Schroder, 2002). However, in an effort to counter this challenge, participation was confidential and anonymous.

Further, the sample was overwhelmingly female, with only 18.2% of the sample being men. Future studies should strive to include a more equal representation of both males and females, as research on MPS and gender is mixed (ACHA, 2011; Low & Gendaszek, 2002; Herman-Stahl et al., 2007; McCabe et al., 2005; SAMHSA; White et al., 2006). Additionally, the sample was predominately Caucasian. A more diverse sample of student characteristics could further our understanding of the memorable

messages recalled by students of varying ethnicities and backgrounds. Collecting memorable messages from various types of students could provide health promotion offices on college campuses with information on the way undergraduates make sense of the decision to engage in illicit behavior during their time in college. Finally, this research did not assess grade point average, which has been found to be associated with MPS in college students (McCabe, 2005b).

Although the goal of this dissertation was to understand the experiences of current college undergraduates and their intention to engage in MPS, as well as their actual misuse of prescription stimulants, it may be useful to move beyond the traditional college student population. For example, investigating attitudes, normative and efficacy beliefs, as well as intentions and use behaviors of traditional college students, graduate students, and working-professional students, may illuminate the message characteristics predictive of MPS of a more representative student sample.

Next, although memorable messages are powerful messages, they are likely only one influence on attitudes, norms, and agency. In fact, this study was unable to find a connection between memorable messages and the TPB variables, likely due to the small sample size and lack of power necessary to detect these influences. Additional research should be conducted with a larger sample of college students, at multiple institutions, to paint a clearer picture of the potential associations between the characteristics of memorable messages, the TPB variables, and MPS behaviors.

A challenge that bridges both theory and methodology focuses on the design of the study. Cross-sectional data collection methods are often used in interpersonal health

communication research, which limits the data's ability to assess trends or changes across time. This challenge is particularly salient for the examination of peer influence and MPS, which likely changes throughout the course of the semester (e.g., freshmen transition to college and place a stronger role on the influence of their peers, seniors seek to pass the last class that stands in their way of graduation). Further, studies that utilize TPB often use a cross-sectional design (Brewer & Rimer, 2008), which is problematic as they may have poor prediction and explanatory power of the behavior because the time order of motivations and behavior cannot be distinguished. To attempt to remedy this concern, this study collected data twice throughout the semester. Although this study did experience some attrition, 65% of the participants who participated in the main study also completed the follow-up questionnaire.

Despite the limitations of this study, there are several implications for interpersonal and health communication researchers, as well as health promotion officials and education campaigns. Next, areas of future research and practical implications of this dissertation are described.

THEORETICAL STRENGTHS AND CHALLENGES: FUTURE DIRECTIONS AND PRACTICAL IMPLICATIONS

A strength of utilizing TPB in the context of MPS among college undergraduates is that TPB clearly outlines the causal relationships among the constructs of the model while having valid and reliable measures to assess the theories constructs (Ajzen & Fishbein, 1980; Ajzen, 1991, 2002). Further, TPB suggests that as a result of an individual's deliberate thinking about the consequences of their actions to engage in a behavior in conjunction with normative pressures of how to behave and perceptions of

control over the behavior, a behavioral intention is formed which then guides behavior. Although the measurement methods are challenging to implement as they rely on pilot data to tailor the items specifically to the specific behavior and population (Brewer & Rimer, 2008), the primary study relied on previously validated and reliable instruments that have been used in evaluating MPS in the context of college student populations. TPB has had limited application to MPS (Gallucci et al, 2015; Judson & Langdon, 2009) but it has been used to examine binge drinking and illicit drug use (Huchting, Lac, & LaBrie, 2008; McCabe et al., 2007a; Norman et al., 2007). This study contributes to the body of literature by further testing TPB through its longitudinal analyses and finding support that behavioral intentions at Time 1 are positively associated with behavioral use at Time 2.

Despite TPB's strengths, it is limited in that it cannot explain why some students hold positive attitudes about MPS, as it focuses on the attitudes, not the causes of that attitude or the different motivations for its use. Further, TPB does not address the role of past behavior, habits, or causality (Cappella, 2008). However, this study accounted for the influence of past behavior by controlling for prior use in its analyses. Further, this research attempted to explain how attitudes, norms, and efficacy are formed through the memorable messages undergraduates recall about MPS. Although there was little support to demonstrate that the memorable message features were related to the TPB variables in this study, future research should continue to explore the association between communication and TPB with a larger and more diverse sample.

While the TPB is a useful framework for understanding behavioral responses in the context of MPS, it also must be recognized that attitudes, perceived norms, and

efficacy may not be the sole determinants of young adults' intentions to engage in MPS. For example, the decision to engage in MPS may not be a planned rational decision; it may be a decision of spontaneity, for example, using stimulants for social motivations. Thus, future research should further examine the specific nuances of what contributes to an undergraduate's decision to engage in MPS—whether it be for academic, social, or other yet-to-be-determined motivations.

Future research could also investigate if the behaviors of students vary as a result of recalling memorable messages about MPS based upon the source of the message (e.g., a message sent by a friend compared to a parent), or the context in which the message was shared (i.e., in a library studying as compared to at a party). This potential line of inquiry may highlight some of the subtleties of why students engage in MPS—whether for academic or social motivations, or based on a planned decision or an act of impulsiveness. Further, though TPB has the ability to account for factors associated with addictive behaviors (Ajzen, 2002), Ajzen (1991, 2002) suggests that behaviors with addictive qualities, such as MPS, have the potential to bypass intention. This investigation could also highlight the impact of memorable messages on behavior (Smith et al., 2009), self-assessment of behavior (Ellis & Smith, 2004; Smith & Ellis, 2001; Smith et al., 2001), and sense-making (Stohl, 1986).

The theoretical implications of this dissertation extend knowledge of the college student experience for interpersonal and health communication researchers. Specifically, there are three overarching explanations for the current study's findings. First, these findings demonstrate the complexity of memorable messages and their relationship to

individual behavior. Because this study did not find support for the connection between features of memorable messages and behavioral intention to engage in MPS, it may be that messages about MPS are more fluid in nature. That is, they may express both positive and negative consequences to the message receiver, thus complicating the individual's intention to engage in MPS. For example, a message that suggests MPS helps people study, but the user could face long-term dependency issues seems to be contradictory. It may be that messages about MPS, or other illicit behaviors, require different processing and sense-making than other forms of memorable messages. Future research should investigate this further.

Second, although peers are a frequent source through which college students gain information about a variety of topics (Baiocco, D'Alessio, & Laghi, 2010; Champlin et al., 2015; Dunn, Vail-Smith, & Knight, 1999; Vogel, Wade, Wester, Larson, & Hackler, 2007), students may be likely to seek additional information about MPS through other sources, such as family members, medical professionals, and the news or media. As 16.1% of the memorable messages were shared from family members, the implications for family communication researchers are important to consider. This research suggests that the average age for prior use of illicit stimulants was 17.3, but ranged from 14-20 years old. Johnston and colleagues (2010b) found that the majority of 12^{th} graders reported receiving prescription stimulants from friends or relatives for free (59%) or by buying them (38%). Thus, by being cognizant that family communication plays a role in recall about memorable messages about MPS, future work should encourage families to convey consistent and informative messages about MPS, *before* and during college.

Third, because the content of the memorable messages was not significantly related to the TPB variables, but the relationship to the sender of the message—specifically perceptions of closeness—was significantly associated with efficacy to predict behavioral intention, it may be that the relationship with the sender of the message about MPS is important to consider when evaluating behavioral intention. It may be that the valence of the message, in addition to perceptions of closeness with the message sender, moderates the relationship between attitudes, normative belief, efficacy and behavioral intention. Perhaps message receivers rely on multiple relational and content cues to derive meaning from the message and decide whether to engage in or refrain from the behavior.

Practical implications for health educators.

As noted in extant research, memorable messages about college and the college experience are important and helpful to students (Kranstuber, Carr & Hosek, 2012; Nazione et al., 2013; Wang, 2012). During high stress periods of the semester (e.g., finals week, midterms), as well as at the start of a new semester, college health promotion offices should devise campaigns that seek to educate students about the health and academic consequences of MPS. This research suggests that attitudes play the strongest role in behavioral intention at this University; thus, campaigns at this University should first target changing student attitudes about MPS.

For example, future campaigns could highlight the longer health and academic risks and consequences of prescription stimulant use as this research suggests that undergraduates at this University generally do not perceive MPS as harmful (M = 9.75),

with a ranking of 10 out of 13. Although students do perceive those that engage in MPS to have an unfair advantage as evidence by this research, future campaigns could also illustrate that MPS may be a violation of the honor code, as MPS is considered a form of academic dishonesty (Custode & Norvilitis, 2012). By additionally reinforcing the harmful outcomes of MPS, these campaigns may change attitudinal belief.

Additionally, it could be that those who have previously used stimulants hold strong positive attitudes about MPS, and are unaware of the long-term impact this behavior has on their health and academic performance. Additionally, this study suggested that about a third of students who had not yet engaged in MPS in college had thought about it. Future research should develop and test health education campaigns designed at targeting both non-users' and prior- or present-users' attitudes about MPS.

Finally, separate campaigns should be developed that target college students who are current prescription holders. As a commonly reported source from which undergraduates obtain stimulant medication to engage in MPS (DeSantis et al., 2008; Garnier-Dykstra, Calderia, Vincent, O'Grady, & Arria, 2012), these campaigns should discuss the possible health and legal consequences of diverting medication (Flory, Payne, & Benson, 2014). It may be that targeting attitudinal change of the diverters may facilitate attitudinal change of undergraduates seeking to engage in MPS.

Conclusion

In summary, MPS among college undergraduates is a growing problem across college campuses, with the misuse and diversion of prescription stimulants being a relatively new and unexplained health behavior with a majority of the studies coming from the National Survey on Drug Use and Health (NSDUH; SAMHSA, 2009), Student Life Survey (SLS, 2010), and the Monitoring the Future Study (MTF; Johnston et al., 2009).

Existing research has identified the motivations and reasons for use among college students, as well as the psychological variables that are related to MPS. However, research has yet to examine the *communication* surrounding MPS that may lead to engaging in MPS. This dissertation described a research study designed to investigate the features of memorable messages surrounding MPS among college undergraduates to predict behavioral intention and actual use of prescription stimulants.

Two theoretical frameworks guided this dissertation: a memorable messages framework (Knapp et al., 1981; Stohl, 1986) as well as the Theory of Planned Behavior (Ajzen, 1985, 1991; Ajzen & Fishbein, 1980). This study sought to accomplish three goals: (1) examine the content, sources and valence of memorable messages about stimulants shared among undergraduates; (2) examine how those characteristics of memorable messages are related to behavioral outcomes directly as well as indirectly through changes in attitudes, normative beliefs, and personal agency; and (3) examine if receiving a memorable message predicted changes in intention to use or actual use of stimulants over time. This study contributes to the literature by further attempting to

understand undergraduate students' experiences with illicit behavior and demonstrating a need for further investigation of students' sense-making in relation to risky decisions made during their college experience.

Appendices

APPENDIX A: INSTITUTIONAL REVIEW BOARD STUDY APPROVAL LETTER

OFFICE OF RESEARCH SUPPORT

THE UNIVERSITY OF TEXAS AT AUSTIN

P.O. Box 7426, Austin, Texas 78713 · Mail Code A3200
(512) 471-8871 · FAX (512) 471-8873

FWA # 00002030

Date: 06/18/13

PI: Brittani L Crook

Dept: Communication Studies

Title: Exploring Memorable Messages about Illicit Stimulant Use Among Undergraduates

Re: IRB Expedited Approval for Protocol Number 2013-05-0103

Dear Brittani L Crook:

In accordance with the Federal Regulations the Institutional Review Board (IRB) reviewed the above referenced research study and found it met the requirements for approval under the Expedited category noted below for the following period of time: 06/18/2013 to 06/17/2014 . *Expires 12 a.m. [midnight] of this date.* If the research will be conducted at more than one site, you may initiate research at any site from which you have a letter granting you permission to conduct the research. You should retain a copy of the letter in your files.

Expedited category of approval:

☐ 1) Clinical studies of drugs and medical devices only when condition (a) or (b) is met. (a) Research on drugs for which an investigational new drug application (21 CFR Part 312) is not required. (Note: Research on marketed drugs that significantly increases the risks or decreases the acceptability of the risks associated with the use of the product is not eligible for expedited review). (b) Research on medical devices for which (i) an investigational device exemption application (21 CFR Part 812) is not required; or (ii) the medical device is cleared/approved for marketing and the medical device is being used in accordance with its cleared/approved labeling.

☐ 2) Collection of blood samples by finger stick, heel stick, ear stick, or venipuncture as follows: (a) from healthy, non-pregnant adults who weigh at least 110 pounds. For these subjects, the amounts drawn may not exceed 550 ml in an 8 week period and collection may not occur more frequently than 2 times per week; or (b) from other adults and children2, considering the age, weight, and health of the subjects, the collection procedure, the amount of blood to be collected, and the frequency with which it will be collected. For these subjects, the amount drawn may not exceed the lesser of 50 ml or 3 ml per kg in an 8 week period and collection may not occur more frequently than 2 times per week.

☐ 3) Prospective collection of biological specimens for research purposes by non-invasive means. Examples:
(a) Hair and nail clippings in a non-disfiguring manner.
(b) Deciduous teeth at time of exfoliation or if routine patient care indicates a need for extraction;
(c) Permanent teeth if routine patient care indicates a need for extraction.

(d) Excreta and external secretions (including sweat).
(e) Uncannulated saliva collected either in an un-stimulated fashion or stimulated by chewing gumbase or wax or by applying a dilute citric solution to the tongue.
(f) Placenta removed at delivery.
(g) Amniotic fluid obtained at the time of rupture of the membrane prior to or during labor.
(h) Supra- and subgingival dental plaque and calculus, provided the collection procedure is not more invasive than routine prophylactic scaling of the teeth and the process is accomplished in accordance with accepted prophylactic techniques.
(i) Mucosal and skin cells collected by buccal scraping or swab, skin swab, or mouth washings.
(j) Sputum collected after saline mist nebulization.

☐ 4) Collection of data through non-invasive procedures (not involving general anesthesia or sedation) routinely employed in clinical practice, excluding procedures involving x-rays or microwaves. Where medical devices are employed, they must be cleared/approved for marketing. (Studies intended to evaluate the safety and effectiveness of the medical device are not generally eligible for expedited review, including studies of cleared medical devices for new indications).
Examples:
(a) Physical sensors that are applied either to the surface of the body or at a distance and do not involve input of significant amounts of energy into the subject or an invasion of the subject's privacy.
(b) Weighing or testing sensory acuity.
(c) Magnetic resonance imaging.
(d) Electrocardiography, electroencephalography, thermography, detection of naturally occurring radioactivity, electroretinography, ultrasound, diagnostic infrared imaging, doppler blood flow, and echocardiography.
(e) Moderate exercise, muscular strength testing, body composition assessment, and flexibility testing where appropriate given the age, weight, and health of the individual.

☐ 5) Research involving materials (data, documents, records, or specimens) that have been collected, or will be collected solely for non-research purposes (such as medical treatment or diagnosis).
Note: Some research in this category may be exempt from the HHS regulations for the protection of human subjects. 45 CFR 46.101(b)(4). This listing refers only to research that is not exempt.

☒ 6) Collection of data from voice, video, digital, or image recordings made for research purposes.

☒ 7) Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.
Note: Some research in this category may be exempt from the HHS regulations for the protection of human subjects. 45 CFR 46.101(b)(2) and (b)(3). This listing refers only to research that is not exempt.

☒ Use the attached approved informed consent document(s).

☐ You have been granted a Waiver of Documentation of Consent according to 45 CFR 46.117 and/or 21 CFR 56.109(c)(1).

☐ You have been granted a Waiver of Informed Consent according to 45 CFR 46.116(d).

Responsibilities of the Principal Investigator:

1. Report immediately to the IRB any unanticipated problems.

2. Submit for review and approval by the IRB all modifications to the protocol or consent form(s). Ensure the proposed changes in the approved research are not applied without prior IRB review and approval, except when necessary to eliminate apparent immediate hazards to the subject. Changes in approved research implemented without IRB review and approval initiated to eliminate apparent immediate hazards to the subject must be promptly reported to the IRB, and will be reviewed under the unanticipated problems policy to determine whether the change was consistent with ensuring the subjects continued welfare.

3. Report any significant findings that become known in the course of the research that might affect the willingness of subjects to continue to participate.

4. Ensure that only persons formally approved by the IRB enroll subjects.

5. Use only a currently approved consent form, if applicable.
   Note: Approval periods are for 12 months or less.

6. Protect the confidentiality of all persons and personally identifiable data, and train your staff and collaborators on policies and procedures for ensuring the privacy and confidentiality of subjects and their information.

7. Submit a Continuing Review Application for continuing review by the IRB. Federal regulations require IRB review of on-going projects no less than once a year a reminder letter will be sent to you two months before your expiration date. If a reminder is not received from Office of Research Support (ORS) about your upcoming continuing review, it is still the primary responsibility of the Principal Investigator not to conduct research activities on or after the expiration date. The Continuing Review Application must be submitted, reviewed and approved, before the expiration date.

8. Upon completion of the research study, a Closure Report must be submitted to the ORS.

9. Include the IRB study number on all future correspondence relating to this protocol.

If you have any questions contact the ORS by phone at (512) 471-8871 or via e-mail at orsc@uts.cc.utexas.edu.

Sincerely,

James P. Wilson

James Wilson, Ph.D.
Institutional Review Board Chair

APPENDIX B: RECRUITMENT ADVERTISEMENT

Exploring Conversations about the Misuse of Prescription Stimulants
IRB#: 2013-05-0103

Researchers: Brittani Crook (Principal Investigator)

You are invited to participate in a research study. The purpose of this study is to understand how college students perceive prescription stimulant use among students.

You are eligible to participate if:

- You do not have a prescription for ADD/ADHD medication
- You are 18 years of age or older

Part 1:
Approximately 1375 undergraduate and 500 graduate students will participate in this study. You will be asked to report your opinions and experiences through an online survey, which will take **approximately 30 minutes** to complete. Your participation is completely voluntary.

To begin the survey, please click on the link below.

[insert link]

Part 2:
An email link will be sent to you approximately 5-8 weeks after you complete Part 1.

We appreciate your help, and please contact Brittani Crook at brittani@utexas.edu if you have any questions.

Thank you!

Brittani Crook, M.A.
Doctoral Candidate
Department of Communication Studies
University of Texas at Austin
brittani@utexas.edu

UT Austin IRB Approved: 06/18/15

APPENDIX C: INTERNET SURVEY CONSENT FORM

IRB APPROVED ON: 09/30/2014 EXPIRES ON: 06/17/2015
IRB STUDY NUMBER: 2013-05-0103

Consent to Participate in Internet Research

Identification of Investigator and Purpose of Study

You are invited to participate in a research study, entitled "**Exploring Memorable Messages and Conversations about Illicit Stimulant Use Among Undergraduates.**"

The study is being conducted by
Brittani Crook, Doctoral Candidate
Department of Communication Studies
The University of Texas at Austin
512-264-4553
brittani@utexas.edu

The purpose of this study: to explore individual conversations about prescription stimulants. Up to 1375 undergraduates and 500 graduate students will participate in this study. You are free to contact the investigator at the above address and phone number to discuss the study. You must be at least 18 years old to participate.

You are eligible to participate in this study if:

- You are 18 years of age or older
- You **have never** been prescribed prescription stimulants (Vyvanse, Ritalin, Concerta, etc.)

If you agree to be in this study, we will ask you to do the following things:

- Complete an online questionnaire.

Total estimated time to participate in this study is approximately 30 minutes.

Compensation:

- You may select if you would like to receive extra credit points toward your grade in *one* of your CMS or ADV classes (at the instructor's discretion) ***OR*** you will be entered into a drawing for an iPad Mini. You may complete an alternative for research credit. If you have questions about the exact amount of extra credit you will earn or the alternative, please contact your instructor prior to completing the survey

Risks/Benefits of being in the study:

- There is a slight risk of psychological or emotional distress due to the sensitivity of the topic (e.g., conversations about the illegal use of prescription stimulants).
- This study may involve risks that are currently unforeseeable. If you wish to discuss the information above or any other risks you may experience, you may email or call the principal investigator listed above, or you may contact the UT Mental Health Center at 512-471-3515.
- There are no individual benefits for participating. However, your participation contributes to researchers' understanding about conversations about prescription stimulants.
- You can also obtain a summary of the results of this study by contacting the researcher (see above information) after May 2015.

Confidentiality and Privacy Protections:

- Responses will be collected from *Qualtrics.com* which guarantees the security and confidentiality of all the data collected. The data resulting from your participation may be made available to other researchers in the future for research purposes not detailed within this consent form. In these cases, the data will contain no identifying information that could associate you with it, or with your participation in any study.

IRB APPROVED ON: 09/30/2014 EXPIRES ON: 06/17/2015
IRB STUDY NUMBER: 2013-05-0103

- At the end of the initial questionnaire, you will be asked to create a unique identification code they can use to complete the follow up survey. The unique identifier will be a combination of the last four digits of the your phone number and the first word of the street they live on (e.g., 9829Lakeshore). You will then be re-directed to a completely separate and new questionnaire where you will be asked to enter your name and email address so that reminder emails and the link for the follow up study can be sent. This separate survey will be used in an effort to protect your confidentiality.
- There is no way to link identifiable information with your survey answers.
- Your email address will be kept during the data collection phase (up to six months) to contact you with one brief, follow up survey (approx. 10 minutes) about your beliefs and attitudes about stimulant use. After you complete the follow up survey, your email address will be separated from your responses.
- Identifying information will be stripped from the final dataset and destroyed at completion of the study.
- Data will be stored on a password protected computer that only the research has access to.

The records of this study will be stored securely and kept confidential. Authorized persons from The University of Texas at Austin, members of the Institutional Review Board, and (study sponsors, if any) have the legal right to review your research records and will protect the confidentiality of those records to the extent permitted by law. All publications will exclude any information that will make it possible to identify you as a subject.

Participation or Withdrawal
Your participation in this study is voluntary. You may decline to answer any question and you have the right to withdraw from participation at any time without penalty. Withdrawal will not affect your relationship with The University of Texas in anyway. If you do not want to participate either simply stop participating or close the browser window.

If you do not want to receive any more reminders, you may email brittani@utexas.edu

Contacts
If you have any questions about the study please email or call the primary investigator, Brittani Crook at 512-264-4553 or send an email to brittani@utexas.edu. This study has been processed by the Office of Research Support and the study number is **2013-05-0103.**

Questions about your rights as a research participant.
If you have questions about your rights or are dissatisfied at any time with any part of this study, you can contact, anonymously if you wish, the Office of Research Support at (512) 471-8871 or email at orsc@uts.cc.utexas.edu.

If you agree to participate, click on the following link **[HTTP://LINK TO STUDY URL]**
The password for the study is **[PASSWORD]**.

Thank you.

Please print a copy of this document for your records.

Consent:

Because this is an online survey, written signatures cannot be used to give your consent to participate. For this study, *your consent is GIVEN when you click "next" to begin the survey.*

I have read the above information and have sufficient information to make a decision about participating in this study. By clicking on "next," I am giving my consent to participate in the study.

APPENDIX D: FAIRNESS OF THE MISUSE OF PRESCRIPTION STIMULANTS ON COLLEGE CAMPUSES MEASURE

Please rate the degree to which you agree with the following statements.

Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

1. It is fair for students at the University to use prescription stimulants that they do not have a prescription for.

2. Students who use prescription stimulants without a prescription at the university have an unfair advantage.

3. If a student takes a prescription stimulant without a prescription, they are cheating.

4. Students who use stimulants without a prescription with the intent of bettering their grades are being academically dishonest.

SCORING:
Item 1 gets reverse coded.

APPENDIX E: DEMOGRAPHIC ITEMS

What is your age?
[Textbox]

What is your classification?
Freshman Sophomore Junior Senior

What is your gender?
Male Female

Are you a student veteran?
Yes No

How do you usually describe yourself?
White
Black, not Hispanic
Hispanic or Latino/a
Asian or Pacific Islander
American Indian, Alaska Native, or Native Hawaiian
Biracial or Multi-racial
Other:

In which college are you enrolled in at UT?
Architecture
Business
Communication
Education
Engineering
Fine Arts
Geosciences
Information
Liberal Arts
Natural Sciences
Nursing
Pharmacy
Public Affairs
Social Work
Undergraduate Studies
Unsure

In which type of residence do you currently live?
On campus

Off-campus dorm/residence hall
Off-campus apartment or house
At home with parents
Other: [Text box]

Are you a member of a fraternity or sorority?
Fraternity Sorority Neither

Please remember that all of your answers are completely anonymous – they will not be matched with your name, EID, or class.

Do you currently have a prescription for stimulants (Adderall, Ritalin, Concerta, Vyvanse, or other ADHD prescription stimulant medication)?
_____ yes _____ no

Have you ever taken prescription stimulants that were not prescribed to you, in your name?
_____ yes _____ no

IF YES:

How old were you when you first use prescription stimulants (e.g., Ritalin, Adderall, Concerta, Vyvanse) that were not prescribed to you? (in years)

_____ years old

Since coming to college, have you personally ever used prescription stimulants (e.g., Ritalin, Adderall, Concerta, Vyvanse) that were not prescribed to you?
_____ yes _____ no

IF YES:

How frequently do you use prescription stimulants?
Multiple times a week
Once a week
A few times a month
Once a month
As needed for a special occasion or exam
Other:

How do/did you usually obtain prescription stimulants?
Purchased It was free I took it without permission Other

How many pills do you usually get at once?
[Text box]

How long do/did pills usually last you?
[Text box]

IF NO:

Have you thought about using prescription stimulants that are not prescribed to you?
_____ yes _____ no

How likely is it that you will use prescription stimulants once or twice in the next 12 months?
1=I definitely will not 4=Unsure 7=I definitely will

How likely is it that you will use prescription stimulants regularly in the next 12 months?
1=I definitely will not 4 = Unsure 7=I definitely will

APPENDIX F: MEMORABLE MESSAGES

Now we want to know a bit more about the memorable message about the non-medical use of prescription stimulants that you remember.

Memorable messages are verbal statements that have been told to you which you may remember for a long period of time or has stuck with you in some way. These statements may also have influenced your life in some way.

The non-medical use of prescription stimulants involves people who have ever taken stimulant medication that is used to manage ADD/ADHD without a prescription (that is, someone uses ADD/ADHD medication that was not prescribed to them by a doctor).

1. Please type the memorable message you recall about the non-medical use of prescription stimulants. Please use exact words, if possible.
   [OPEN ENDED]

2. How certain are you that you recalled the exact wording of the memorable message?
   1=certain 2=moderately certain 3=uncertain

3. Would you describe this message as
   1=Positive 2=Neutral 3=Negative

4. How long ago did you receive this memorable message? (In months)
   [Text box]

5. About how old were you when you first heard this message? (in years)

6. Please describe the situation and what led to this person sharing the message. Please be as detailed as possible.
   [OPEN ENDED]

7. Where were you when you received this message?
   [OPEN ENDED]

8. What were you doing when you received this message?
   [OPEN ENDED]

9. Was there anyone else with you when you received this message? If yes, please generally describe who else was present. (For example, close friends; a study group; siblings, etc.).
   [OPEN ENDED]

10. Who told you this message?
    a. Sibling
    b. Best Friend
    c. Friend
    d. Classmate
    e. Roommate
    f. Fraternity Brother
    g. Sorority Sister
    h. Other (please specify)

11. What was the sex of this person?
    Male Female

12. About how old was the person who told you this message? (in years)
    [Text box]

13. Was the person who told you this message enrolled at a university or college when they shared this memorable message?
    Yes No

    [If yes]

    a. What is their year in school when they told you this message?

    Freshman Sophomore Junior Senior Grad Student

    b. What is their area of study?
    Architecture
    Business
    Communication
    Education
    Engineering
    Fine Arts
    Geosciences
    Information
    Liberal Arts
    Natural Sciences
    Nursing
    Pharmacy
    Public Affairs
    Social Work
    Undergraduate Studies
    Unsure

c. Is the person a member of a Greek organization?
Yes No

d. Why do you think this person shared this message with you?

14. Please describe any attitude changes you experienced as a result of receiving this message.
[Text box]

15. Please describe any behavioral changes you experienced as a result of receiving this message.
[Text box]

16. Think of a time when you have remembered this message. Please describe the situation when you recalled this message.
[Text box]

17. About how many times do you think you have heard this message, or a message similar to this?
[Text box]

18. If you have any other information you would like to share about this message, please do so here:
[Text box]

APPENDIX G: RELATIONAL CLOSENESS AND SIMILARITY

(Vangelisti & Caughlin, 1997)

Please respond to the following items thinking about the person who shared the message that you reported on previously.

Psychological Closeness

Not at all						Very
1	2	3	4	5	6	7

1. How close are you to this person?
2. How much do you like this person?
3. How often do you talk about personal things with this person?
4. How important is this person's opinion to you?
5. How satisfied are you with your relationship with this person?
6. How much do you enjoy spending time with this person?
7. How important is your relationship with this person?

Similarity

Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

1. This person and I like a lot of the same things.
2. This person and I share a lot of the same attitudes about things.
3. This person and I have very different values.
4. This person and I are very similar.
5. This person and I have a similar outlook on life.

SCORING:
Similarity Item 3 gets reverse coded.

APPENDIX H: THEORY OF PLANNED BEHAVIOR - ATTITUDES

Adapted from Ajzen (2002)

For me to take prescription stimulants that are not prescribe to me while I am enrolled in school is

Harmful:	1	2	3	4	5	6	7	:Beneficial
Pleasant:	1	2	3	4	5	6	7	:Unpleasant
Good:	1	2	3	4	5	6	7	:Bad
Worthless:	1	2	3	4	5	6	7	:Valuable
Enjoyable:	1	2	3	4	5	6	7	:Unenjoyable

SCORING:
Items 2, 3, and 5 are reverse coded.

APPENDIX I: THEORY OF PLANNED BEHAVIOR – NORMS

Adapted from Ajzen (2002)

Please rate the degree to which you agree with the following statements.

Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

1. Most people who are important to me think that I should use prescription stimulants that are not prescribed to me.
2. It is expected of me that I use prescription stimulants that are not prescribed to me while I am enrolled at UT.
3. The people in my life whose opinions I value would approve of my use of prescription stimulants that are not prescribed to me.
4. Most people who are important to me at UT use prescription stimulants that are not prescribed to them.
5. The people in my life whose opinions I value use prescription stimulants that are not prescribed to them.

APPENDIX J: THEORY OF PLANNED BEHAVIOR – EFFICACY

Adapted from Ajzen (2002)

1. For me to use prescription stimulants that are not prescribed to me while I am enrolled at the University would be

Impossible: 1 2 3 4 5 6 7 :Possible

2. If I wanted to, I could take prescription stimulants that are not prescribed to me while I am enrolled at the University

Definitely True: 1 2 3 4 5 6 7 :Definitely False

3. How much control do you believe you have over taking prescription stimulants that are not prescribed to you while enrolled at the University

No control: 1 2 3 4 5 6 7 :Complete Control

Strongly Agree	Agree	Somewhat Agree	Neutral	Somewhat Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6	7

4. It is mostly up to me whether or not I use prescription stimulants that are not prescribed to me while enrolled at the University
5. I am capable of getting prescription stimulants (e.g., Adderall, Ritalin, Vyvanse, Concerta)
6. If I got prescription stimulants that were not prescribed to me, I am confident I know how much to take.
7. If I got prescription stimulants that were not prescribed to me, I could resist giving them to others.
8. I am capable of resisting taking prescription stimulants that are not prescribe to me if it was offered to me from a friend.
9. I am able to resist taking prescription stimulants that are not prescribed to me if I was in possession of some.

SCORING:
Item 1 is reverse coded.

APPENDIX K: THEORY OF PLANNED BEHAVIOR – BEHAVIORAL INTENTION

(Adapted from Norman et al., 2007 and Ajzen, 2002)

Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

1. I would use prescription stimulants that were not prescribed to me.
2. I will try prescription stimulants that are not prescribed to me while I am in school.
3. I intend to take prescription stimulants that are not prescribed to me while I am in school

APPENDIX L: SENSATION SEEKING

(Hoyle et al, 2002)

Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

1. I would like to explore strange places.
2. I get restless when I spend too much time at home.
3. I like to do frightening things.
4. I like wild parties.
5. I would like to take off on a trip with no pre-planned routes or timetables.
6. I prefer friends who are excitingly unpredictable.
7. I would like to try bungee jumping.
8. I would love to have new and exciting experiences, even if they are illegal.

APPENDIX M: INTERNAL RESTLESSNESS

(Weyandt et al, 2003)

None of the time						All of the time
1	2	3	4	5	6	7

1. I am organized.
2. I am told that I interrupt people.
3. Thoughts race through my mind.
4. Mental restlessness prevents me from sleeping.
5. I am always thinking; I have difficulty putting thoughts to rest.
6. While listening to others, my attention drifts to unrelated thoughts.
7. I lose my train of thought conversing with others.
8. I have urges to blurt out thoughts.
9. I have difficulty maintaining focus.
10. I feel compelled to interrupt others during conversations.
11. I feel mentally calm.
12. I have difficulty relaxing because of reoccurring thoughts.
13. I am distracted by sounds.
14. I have difficulty organizing my thoughts.
15. I replay situations in my mind.
16. I worry about becoming bored.
17. I focus on tasks.
18. I have difficulty planning.
19. Unrelated thoughts seem to pop into my head.
20. I am distracted by visual stimuli.
21. My mind wanders
22. Many possible outcomes to future scenarios run through my mind.
23. I seek mental stimuli.
24. I feel internally restless.

SCORING: Items 1, 11, and 17 are reverse coded.

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